PUBLIC WORKS & FACILITIES

9

This chapter provides requirements for preparing public improvement and facilities construction plans and information for developing construction bid documents for submittal to Capital Project Management. It also specifies various building standards for city facilities.

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Capital Projects
7447 E Indian School Road
Suite 205
480-312- 7250

Municipal Services
9191 E San Salvador Dr
480-312- 5550

One Stop Shop
7447 E Indian School Road
Suite 100
480-312-2500

Plan Review
7447 E Indian School Road
Suite 105
480-312-7080

www.ScottsdaleAZ.gov/Design/DSPM

public works
& facilities

INFRASTRUCTURE PLAN REQUIREMENTS

9-1

This section specifies the submittal and review process and requirements for public infrastructure projects, including guidance for preparing plan, profile, and detail sheets.

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INFRASTRUCTURE PLAN REQUIREMENTS

GENERAL INFORMATION

DESIGN STANDARDS AND GUIDES

A. Standard Specifications and Details

The following publications or their current revisions are to be used in conjunction with the infrastructure design criteria in this manual:

- MAG Uniform Standard Specifications and Details - Maricopa Association of Governments (MAG)
- COS MAG Supplemental Specifications and Details – City of Scottsdale (COS), www.scottsdaleaz.gov/design/COSMAGSupp
- Standard Specifications for Road and Bridge Construction – Arizona Department of Transportation (ADOT)
- ADOT Standard Drawings
- Other governmental/utility agency specifications and details as specified by city staff

B. Design Policies and Guidelines

The city of Scottsdale design policies and guidelines are based upon the following:

- Project stipulations from the city's Development Review Board
- A Policy on Geometric Design of Highways and Streets – American Association of State Highway and Transportation Officials' (AASHTO)
- Roadside Design Guide - AASHTO
- Manual on Uniform Traffic Control Devices
- ASTM/ASHTO standard specifications
- Public Improvement Project Guide - Arizona Utility Coordination Committee
- Other design standards, policies, and guides as specified by city staff

SUBMITTAL REQUIREMENTS

See Appendix 9-1A for Capital Projects plan review process. Infrastructure Plan submittals must comply with the following standards:

1. Prepare plans on standard 'D-size' (24-inch x 36-inch) sheets, and clearly reproduce them on Diazo print paper in a blue or black line format.
2. The city will furnish, upon request, electronic files in MicroStation or AutoCAD of base drawings shown in the figures in this section. The consultant will be responsible for the completion of the drawings as applicable to the project.
3. Place a standard city title block in the lower right hand corner of each sheet, except the cover sheet. The engineering company's identification should be in the upper right hand corner of the sheet.

4. Make sure the minimum lettering size is 3/16 inch for manually drafted or 1/8 inch for mechanically produced lettering, and is legible when reduced 50 percent. Reproductions of drawings must be legible when microfilmed or reduced to 1/2 scale. Adhesive backed appliqués for lettering and/or shading will not be permitted without approval of CPM Plan Review.
5. On all sheets that have maps or plans, North will be oriented to the top of the sheet or to the right. Show a North arrow and bar scale on each sheet. Project stationing should increase from left to right on the sheet.
6. Keynote all construction notes. Group construction keynote referencing to a specific symbol (square symbols designate demolition and removals, diamond symbols designate relocations and circular shapes for construction items). Number notes uniquely such that one number represents a specific note that only occurs on the applicable plan sheets. Each construction note should be circumscribed by the appropriate symbol. Upon request, the city will provide a sample format for the consultant to follow.
7. All projects must comply with Section 404 of the Federal Clean Water Act. Before the city may issue development permits for a project, this 404 Certification Form must be completed and submitted with improvement plans to the CPM Design and Plan Review staff (www.scottsdaleaz.gov/design/dspm/forms). Consultants are advised to apply to the Corps as early as possible for a Section 404 permit and allow for the necessary processing time to prevent delays in obtaining development permits from the city.
8. All projects must comply with the Scottsdale's Protection of Archeological Resources Ordinance (www.scottsdaleaz.gov/historiczoning/arch.asp). To help identify, preserve, and protect archaeological sites, an archaeological survey and report by a qualified archaeologist is required to be submitted for all public and private developments in Scottsdale. A qualified archaeologist is an individual or firm meeting the Arizona State Museum's standards and professional qualifications for an archaeologist. Please contact the Preservation Division 480-312-7013 or your Project Manager or Project Coordinator for more information on archaeology requirements, including which projects may be exempt from requiring the survey and report.
9. Make sure all projects submitted for review and/or further processing are complete and consist of plans, specifications, structural calculations, geotechnical report, drainage report, native plant information, and other documentation as required for that project.
10. The designer must submit a minimum of 3 full size sets of plans, 2 sets of specifications, 1 set of structural calculations and drainage calculations when applicable. In addition, the designer will provide additional plans, specifications and other documentation as required for internal user group review purposes.

11. The engineer responsible for the design must seal all plans and documents submitted for review and mark them with the following: "For Review Purposes, Not to Be Used for Bidding or Construction." The registrant's signature will also be required on the plans and documents when the submittal reaches the level of 90 percent or better.
12. Provide an electronic copy of the final drawings and specifications utilizing the MicroStation Format.

9-1.200 PLAN SHEET NUMBERING & SEQUENCING

Sheets will be identified by design discipline as designated below and consecutively whole numbered within each discipline. Additionally, final consecutive numbering of the entire set of plans shall be provided on each sheet.

The sheet numbering prefixes shown in Figure 9.1-1 are commonly used. The consultant will review the sheet sequencing and/or intended numbering with the city's project manager

PLAN SHEET NUMBERING & SEQUENCING

Plan sheet prefixes:

G = General	ITS = Intelligent Transportation System
P = Paving	I = Irrigation
SD = Storm Drain	L = Landscape
SS = Sanitary Sewer	S = Structural
W = Water	M = Miscellaneous Plans By Others
TS = Traffic Signalization, Signing, Markings	RW = Right of Way

Plan sheets shall be sequenced as follows:

1	G1	City cover sheet
2	G2	Notes, legend, and key map sheet
3	G3	Quantity summary sheet
4	P1…	Paving plans, profiles, and details
5	SD1…	Storm drain plans, profiles, and details
6	SD__ …	Profiles for catch basins and connecting pipe
7	SS1…	Sanitary sewer plans, profiles, and details
8	W1…	Water line plans, profiles, and details
9	TS1…	Traffic signal plans, schedules and details, traffic signing, pavement markings
10	ITS1…	Intelligent Transportation System plans, profiles, and details
11	I1…	Irrigation plans, profiles and detail sheets
12	L1…	Landscaping plans, notes, legend, abbreviation and detail sheets
13	S1…	Bridge and structural plans, and details
14	M1…	Plan sheets by others: electric, telephone, gas, irrigation, cable television
15	RW1	Right of Way Strip Map

FIGURE 9.1-1. PLAN SHEET NUMBERING & SEQUENCING

DETAILED SHEET INFORMATION

9-1.300

COVER SHEET

9-1.301

The city will furnish an electronic drawing file of the cover sheet upon request (see Figure 9.1-2). The Engineer will add the following:

- Project title, CPM project number, bid call number.
- Vicinity map with section, township, range, and parcel numbers.
- Sheet index
- Engineering company identification and engineer's seal
- Other agency approval blocks as applicable
- City benchmarks for project – a minimum 2 required on NAVD 1988 datum.
- City assigned plan review, development review, and native plant numbers assigned by Project Review when submitted.

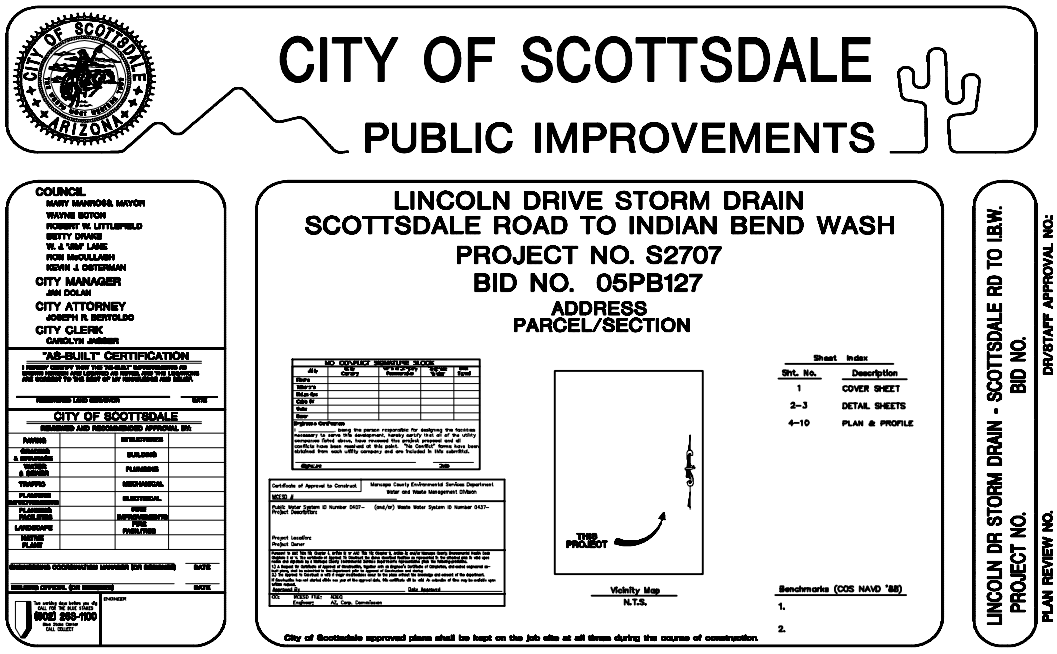

FIGURE 9.1-2. TYPICAL COVER SHEET

9-1.302 NOTES, LEGEND AND KEY MAP SHEETS

- Key Map - Show all intersections, rights-of-way, and key to all plans with stations
- Legend of symbols used for existing and design elements
- List of abbreviations used in plan set (other than as shown in the MAG Specifications)
- Include city of Scottsdale general construction notes for Public Works Construction (see Figure 9.1-3 & 9.1-4) in addition to any special project notes generated.

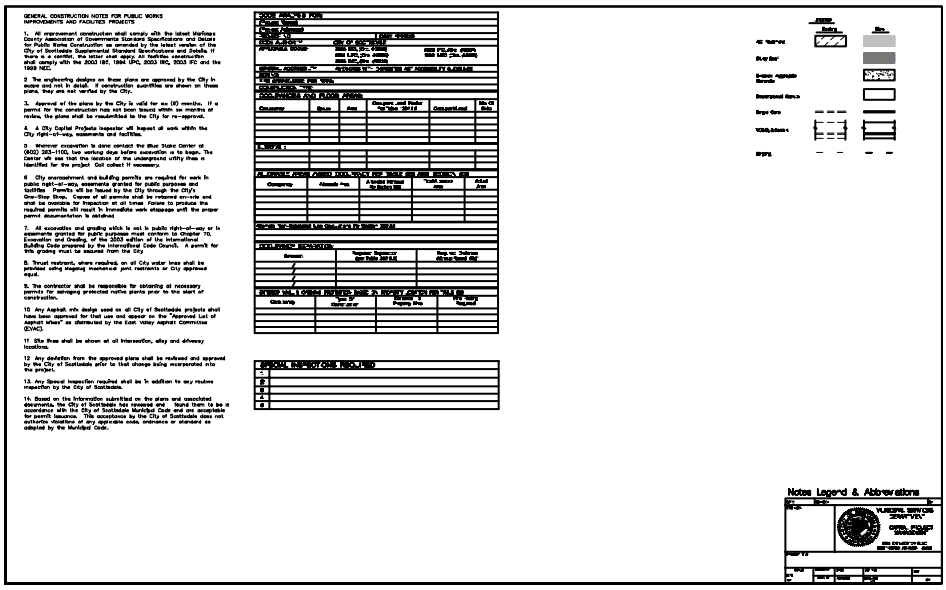

FIGURE 9.1-3. NOTES SHEET

GENERAL CONSTRUCTION NOTES

1. All improvement construction shall comply with the latest Maricopa County Association of Governments Standard Specifications and Details for Public Works Construction as amended by the latest version of the city of Scottsdale Supplemental Standard Specifications and Details. If there is a conflict, the latter shall apply. All facilities construction shall comply with the 2003 IBC, 1994 UPC, 2003 IMC, 2003 IFC and the 1999 NEC.
2. The engineering designs on these plans are approved by the city in scope and not in detail. If construction quantities are shown on these plans, they are not verified by the city.
3. Approval of the plans by the city is valid for 6 months. If a permit for the construction has not been issued within six months of review, the plans shall be resubmitted to the city for re-approval.
4. A city Capital Projects Inspector will inspect all work within the city rights-of-way, easements and facilities.
5. Wherever excavation is done contact the Blue Stake Center at 602-263-1100, two working days before excavation is to begin. The Center will see that the location of the underground utility lines is identified for the project. Call collect if necessary.
6. City encroachment and building permits are required for work in public rights-of-way, easements granted for public purposes and facilities. Permits will be issued by the city's One Stop Shop. Copies of all permits shall be retained on-site and shall be available for inspection at all times. Failure to produce the required permits will result in immediate work stoppage until the proper permit documentation is obtained.
7. All excavation and grading which is not in public rights-of-way or in easements granted for public purposes must conform to Chapter 70, Excavation and Grading, of the 2003 edition of the International Building Code prepared by the International Code Council. A permit for this grading must be secured from the city.
8. Thrust restraint, where required, on all city water lines shall be provided using Megalug mechanical joint restraints or city approved equal.
9. The contractor shall be responsible for obtaining all necessary permits for salvaging protected native plants prior to the start of construction.
10. Any Asphalt mix design used on all city of Scottsdale projects shall have been approved for that use and appear on the "Approved List of Asphalt Mixes" as distributed by the East Valley Asphalt Committee (EVAC).
11. Site lines shall be shown at all intersection, alley and driveway locations.
12. Any deviation from the approved plans shall be reviewed and approved by the city of Scottsdale prior to that change being incorporated into the project.
13. Any Special Inspection required shall be in addition to any routine inspection by the city of Scottsdale.
14. Based on the information submitted on the plans and associated documents, the city of Scottsdale has reviewed and found them to be in accordance with the city of Scottsdale Municipal Code and are acceptable for permit issuance. This acceptance by the city of Scottsdale does not authorize violations of any applicable code, ordinance or standard as adopted by the Municipal Code.

FIGURE 9.1-4. GENERAL CONSTRUCTION NOTES FOR PUBLIC WORKS IMPROVEMENTS & FACILITIES PROJECTS

QUANTITY SUMMARY SHEET

9-1.303

The city will provide a blank format for quantity summaries upon request (see Figure 9.1-5 below). The sequence number preceding the bid item should correspond to the construction note number on the plan sheets.

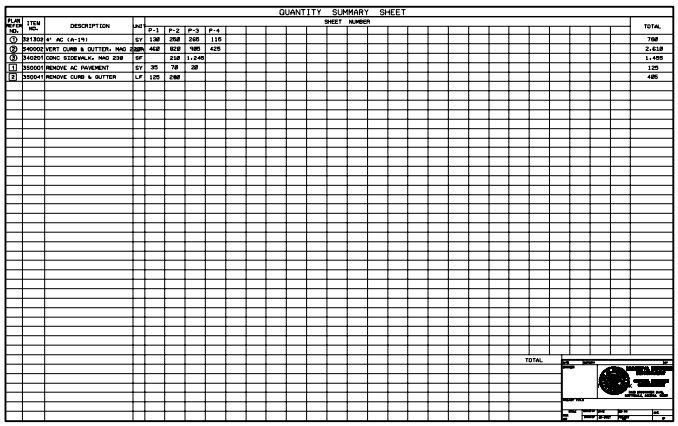

FIGURE 9.1-5. QUANTITY SUMMARY SHEET

9-1.400 PAVING PLAN, PROFILE & DETAIL SHEETS

9-1.401 SHEET FORMAT

1. Single plan and profile sheet, Highway Federal Aid Sheet - Plate 1 format, scale: 1 inch = 20 feet and not to exceed 500 feet per sheet; separate profiles for each curb and gutter and crown line at 1 inch = 2 feet vertical scale and 1 inch = 20 feet horizontal, using 3-inch separation between profiles.
2. Removal, construction, and other notes will be categorically and numerically referenced and listed on the right-hand side of sheet. Use the same number for like work on all sheets including the quantity summary sheet. Categorize notes to type of operation, i.e. demolition/removal notes are first followed by construction notes, relocation notes, sheet notes and sheet cross-reference notes. Quantities shall be shown within each construction note and duplicated to the quantity summary sheets. Upon request, the city will provide a sample format for the consultant to use.
3. In the area of match lines, portions of the same street are not to be repeated on separate sheets. Match lines will show stationing and adjacent sheet number.
4. Intersections will not be cut by match lines and shall be complete from BCR (beginning of curb return) to ECR (end of curb return) on same sheet. When intersecting streets are to be improved beyond ends of curb returns, additional plan and profile sheets should be used to detail the intersecting street. The intersections at the beginning and end of the project shall be fully shown.

9-1.402 HORIZONTAL GEOMETRICS

1. City major streets are typically centered along section lines, from section corner to section corner. Bearings need not be shown on plans; but deflection angles at alignment changes and all angles of intersecting streets must be shown. All section corners, tangent points, Point of Intersection (PI) of curvilinear sections, beginning and ending taper points and monument lines of all intersecting streets shall be labeled and stationed. Survey markers shall be installed per MAG Standard Details.
2. Show centerline stationing on plan and profile. Stationing numbers should be chosen to prevent "negative" stationing. The project need not start with 0+00. On curved sections the stationing should be along the centerline of the curve and not the tangent lines.
3. Show curve data on the same sheet as the curve. Stationing will run from South to North and from West to East.

4. On streets that are not centered on the monument line, the stationing will be along the construction centerline, which shall also be the proposed crown line, unless superelevation or other conditions dictate otherwise. On such streets, the rights-of-way will be measured from the monument line. The offset between the monument line and construction centerline shall be shown and all offsets shown for new construction shall be from the construction centerline.
5. Design on intersecting streets will be done in accordance with the city furnished geometrics and guides (see Section 5-3). Care must be taken to ensure a smooth grade in all directions through intersections. Special design work sheets are required to show profiles on the intersecting street to ensure smooth grades in both directions. These work sheets are to be included with the grade and alignment submittals (see Figure 9.1-6 below).

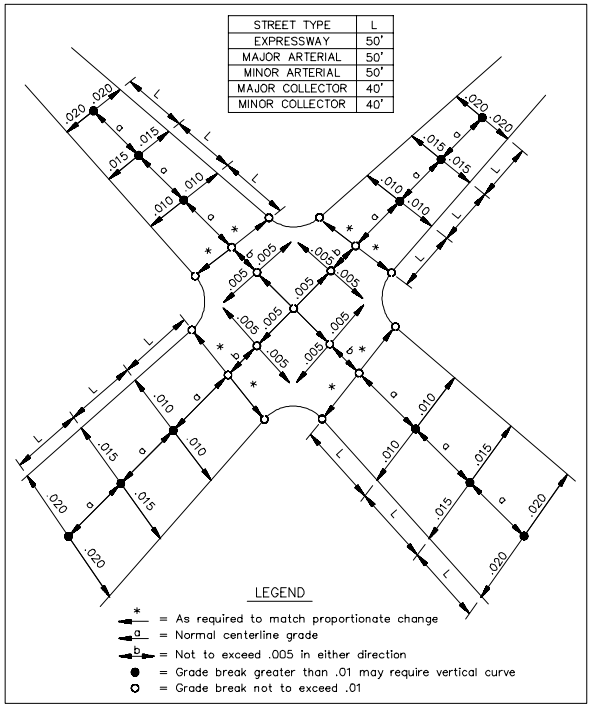

FIGURE 9.1-6. INTERSECTION CROSS-SLOPES & CROWN RUN-OFF

6. Curb return radii shall conform to type of street intersection as described in COS design criteria and procedures. All curb returns at intersecting streets (including along frontage roads) shall have sidewalk ramps conforming to Americans with Disabilities Act (ADA) standards. All curb return radii shall be dimensioned on the plans to back of curb. These pedestrian ramp requirements include the installation of detectable warning devices (truncated domes) per Section 5-8.300 and COS MAG Supplemental Standards, 2231 through 2235 (www.scottsdaleaz.gov/design/detaildrawings). Detectable warning devices should also be installed at other locations where there is an intersection of pedestrian areas and vehicular areas where ramps may not be used, such as at raised pedestrian crossings.
7. On all existing roadways and intersecting streets, the plans will show dimensions from monument line to rights-of-way and to existing back of curb. Existing medians, sidewalks, etc. will be clearly dimensioned and labeled.
8. All new pavements should be fully dimensioned to the edge of pavement or back of curb and tied to horizontal control lines.

9-1.403 TOPOGRAPHY AND NOTATION

1. Show all subdivision names, block numbers, lot numbers, property splits, lot dimensions, addresses, names of major businesses, schools, fire stations, and other public facilities.
2. Show final rights-of-way as a heavy ink line. Show original rights-of-way, where it differs from the new rights-of-way line, with a lighter weight line.
3. Show all existing alleys and easements with proper designations and dimensioning. Show all new easements required for the project, including temporary or permanent.
4. Show all underground utilities and appurtenances and their distances from the monument line and label size, type of material, and type of utility. Utilities that are abandoned, or to be abandoned or removed should be indicated. Any utilities to be constructed prior to the project should be shown and so indicated. Underground electrical lines shall be denoted as direct burial cable or conduit-enclosed cable.
5. Show all buried fuel tanks. When the new rights-of-way is in an area where such tanks may exist, a special effort should be made to check for the possibility of their existence.
6. Show existing underground concrete pavements. Core borings should be utilized to determine the existence of such pavements when authorized by the city.
7. Show existing site conditions and topography to at least 10 feet beyond the new rights-of-way line or any required easements. Use standard MAG symbols where applicable. Show all information for buildings, canopies, asphalt aprons and overhangs within 30 feet of the new rights-of-way. Existing site information should be screened approximately 40 to 60 percent, to the satisfaction of CPM plan review.
8. Show all signs within the new rights-of-way and 20 feet beyond the rights-of-way. Electric signs will be so noted and their source whether overhead or underground identified.
9. Show diameter and variety of trees and shrubs within 30 feet of the new rights-of-way, and within temporary construction easements. The city will determine the disposition of all trees and shrubs. If slight changes in alignment could be made to save valuable trees or the sidewalk could be realigned by acquisition of additional rights-of-way, it should be brought to the attention of the city's project manager at the earliest time possible.
10. Show all utility poles. Differentiate between power poles with street lights and those without. Also show all traffic signal poles and their appurtenances.
11. Show all subdivision entrance structures and indicate any utility connections. When these interfere with new construction they should be relocated or reconstructed. At times it may be necessary to obtain rights-of-way for these structures.
12. As-built drawings or sufficient elevations must be obtained to indicate the direction of surface flow on all intersecting streets, frontage roads, and parking lots. The direction is to be shown by a small arrow.
13. Where certain items such as monuments, water valves, water meters (sizes if relocation is indicated) etc., are shown on city utility maps or record drawings but are not located, they should be shown and labeled "not found" on the plans.
14. Show all existing sprinkler systems. Where new construction requires alterations, these sprinkler systems must be put back in operation by the contractor and will be so noted on the paving plan sheets (or landscape plans).
15. Where new rights-of-way is required, the consultant must investigate if any disconnected water or sewer connections (stub-outs) are completed to the old rights-of-way line only. Where this occurs, show the service connection (size and material) to be extended to the new rights-of-way line. Galvanized services will be replaced in their entirety. The city will furnish a new meter if the old meter is faulty.
16. Show all existing safety curbs. Call for relocation of existing safety curbs and the addition of new safety curbs where required.

PROFILES AND GRADES

9-1.404

1. Construction benchmarks will be a maximum of 1,000 feet apart and each sheet will refer to the nearest benchmark. All benchmarks must be based on the COS datum and at least 2 benchmarks on a project will be existing city monuments. Elevations of city benchmarks will be furnished by Field Engineering upon request and are available on-line at www.scottsdaleaz.gov/landsurvey/. See Section 3-3 for more information.

   Some areas of the city have experienced considerable ground subsidence. Report variations from recorded city benchmarks to Field Engineering at 480-312-5750.
2. The proposed construction centerline profile will show the profile of the existing surface at the construction centerline. The proposed curb and gutter profiles will also show the existing surface line at the location of the new curb line. If the proposed curb and gutter are adjacent to the existing curb of a frontage road, the existing surface line will be omitted and the top of the existing curb of the frontage road will be shown.
3. Top of embankments at ditches and bottom of ditches will not be shown to express existing surface lines. They may be shown in addition to existing surface lines if properly labeled.
4. Existing ground elevations along the rights-of-way lines should be indicated by tick marks along the left and right gutter profile lines at approximately 100-foot intervals.
5. If the ditch bottom or banks occur at the property line, the elevation to be shown in the profile for the property line will be taken beyond the ditch on "average" ground and the offset noted.
6. Existing roadway profiles will be extended to a minimum of 300 feet past the ends of the project to assure a smooth transition between the existing and new roadway.
7. Elevations must also be shown in the profile at all driveways, sidewalks, and parking lots. Elevations of building floors within 30 feet of the property line will also be shown in the profile and any other buildings that appear to be low compared to street grades. Sufficient elevations beyond the property line will be recorded in the field notes at driveways that may require significant alterations beyond the property line.
8. Cross section work sheets (scale of 1 inch = 5 feet at 50 feet intervals) depicting the proposed street cross section, in areas where new curb and gutter is retrofitted into existing pavement and less than one lane of pavement adjacent to the curb is removed and replaced, are required to insure smooth cross sectional transitions.
9. Sufficient elevations will also be taken and recorded in the field notes of all parking areas, driveways, and private property to be certain that the property will properly drain with the new curb grades. Consulting engineers are responsible for proper drainage of paved areas on private property if drainage was into public streets prior to improvements. The importance of this survey information, its recording on the profiles, and its use in setting proper street grades cannot be overstressed. No unwarranted ponding on paved areas on private property will be permitted. If, in the opinion of the city, this information is not sufficient to properly check the proposed grade, the plans will be returned to the consultant.
10. Elevations of existing water valve nuts will also be shown in the profile with the appropriate symbol. It is the responsibility of the consultant to uncover these valves, obtain the elevations, and replace the cover and any excavated pavement.
11. Longitudinal and transverse grades will be designed for proper drainage following the guidelines of COS design criteria, standards, and ordinances (see Figure 9.1-4). Proposed curb grades will be set to drain all paved adjacent property. Where this is not possible, catch basins may be required beyond the rights-of-way lines, but only where permanent rights-of-way or permanent drainage easements are obtained for the catch basin. In projects with flat longitudinal slopes, the grades will be set to prevent sump conditions that may flood private property during large storms. Chapter 37 of the City

Code stipulates specific requirements for depth of water in roadways and minimum numbers of clear lanes during storm runoff (www.scottsdaleaz.gov/codes). The consultant will obtain and design to these requirements.

12. Where possible, grades should be set to reduce high crowns where they exist. This will assist the flow of floodwaters and prevent backup into houses. Care should be used in lowering existing streets since excavation to construct pavements may uncover existing utilities and possibly change drainage patterns.
13. Any streets with horizontal curves sufficient to require superelevation should be designed in accordance with AASHTO guidelines. The consultant is advised to discuss this subject with the city prior to design of superelevation. Limitations on the use of super-elevations are described in COS design criteria and standards.

9-1.405 STORM DRAIN PLAN, PROFILE AND DETAIL SHEETS

A. Storm Drain Design Sheet

Alternate storm drain piping materials should be summarized on a single sheet and shall reference types of materials, design dimensions, material strengths, bedding conditions, soils information, etc. See Figure 9.1-7 below for an example.

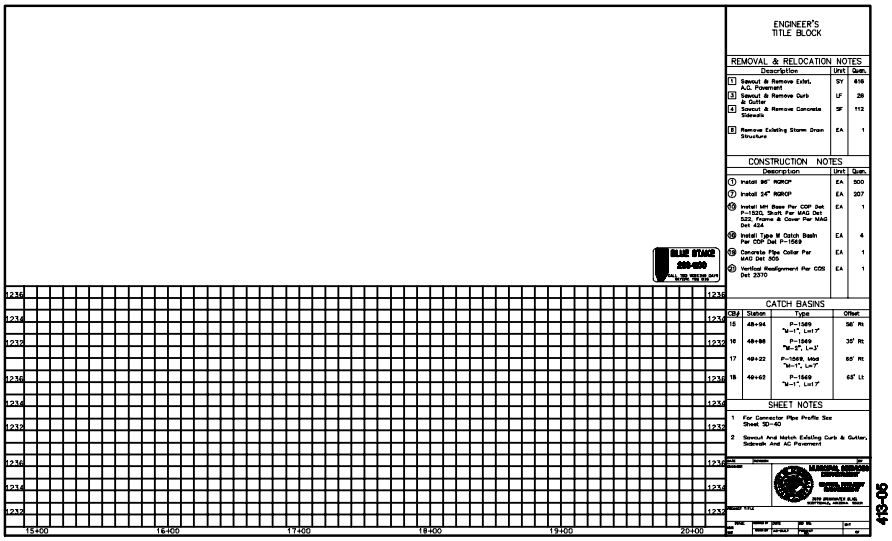

FIGURE 9.1-7. STORM DRAIN PLAN & PROFILE SHEET

B. Sheet Orientation

Sheets are to be oriented and have the same horizontal scale as the paving plans (typical vertical scale: 1 inch = 5 feet).

C. Topography and Notation

1. Storm drain drawings will show all of the existing utilities and any new utilities proposed within a minimum of 30 feet of the centerline of the storm drain. It shall also show other existing topography as shown on the paving plans (or to within 30 feet of the drain centerline if not located within right- of-way) that is pertinent to drainage.
2. These drawings will show, in plan, all proposed storm drain pipe, manholes, catch basins, connector pipes, pipe collars, and other drainage appurtenances. These items

should be listed referenced to standard details, and plan sheet quantity noted in the right-hand column. Add reference to sheets where details or sections are shown.

3. Storm drain main lines, connector pipe, and catch basins will also be shown, in plan, on the paving sheets. A reference to the appropriate sheet number for the storm drain plans will be shown on each paving plan sheet.
4. If the storm drain main is existing and no separate storm drain plans are required, the catch basins and their lines will be called out on the paving plans. Details of catch basin with connecting pipes will be included with paving details.
5. Conflicts with existing utilities will be noted in both plan and profile.

D. Horizontal Alignment

The most satisfactory alignment is determined by the location of existing facilities. Desired location is near the centerline of the existing or proposed street. Existing utilities crossed under at an angle less than 45 degrees may require special design considerations and should be avoided. Location of the storm drain should consider the interference of water main thrust blocks and the need to provide maintenance on either system.

E. Profiles and Grades

1. An overall system profile sheet will be included with the set and shall show the pipe sizes, grades, and locations of manholes, and lateral connections. The hydraulic grade lines will be shown along with the existing/proposed finish grade over the pipe. Crossing utilities including sanitary sewer lines, water lines greater than 12 inches, storm drain lines, and major electric and telephone feeds shall be indicated at their proper locations.
2. The storm drain pipe and manholes shall be shown in profile. The pipe size and the slope to 4 significant figures shall also be shown in the profile. The existing ground over the proposed pipe and the proposed grade shall be shown.
3. Design of storm drain systems shall be per COS design criteria and standards. The Consultant shall obtain the applicable criteria and standards and arrange for a consultation with the city Flood Plain Administrator prior to starting design of the storm drain system. This is very important since the drainage areas to be considered in the design may vary.
4. Generally for maintenance reasons, the minimum pipe size required for the main is 24 inches and the lateral collector pipe shall be 18 inches. Smaller diameter pipes require staff approval and will be considered by the city if utility conflicts may be avoided and the pipe has sufficient capacity to carry the design flows.
5. All existing or proposed utilities crossing the new storm drain shall be shown in the profile at their proper as-built, field-verified, or potholed locations.
6. Prefabricated fittings shall be used for all new horizontal or vertical bends where feasible. Locations of bends or fittings shall be called out on plan and profile.

PROFILES FOR CATCH BASINS AND CONNECTING PIPE 9-1.406

A. Sheet Orientation

- These sheets are to be all cross-section sheets, Highway Federal Aid Sheet - Plate 3 format.
- Sheets should have the appropriate COS title blocks.
- Catch basins and their connecting lines will be drawn facing North or facing East.
- Scale is typically 1 inch = 5 feet; and the horizontal and vertical scale will be the same.

B. Profiles and Grades

1. Profiles should show the correct top of curb elevation at the catch basin and a cross section of the proposed catch basin. Invert elevations of the connector pipe will be shown at the outlet from the catch basin and the inlet to the storm sewer as well as any grade breaks. Show the size of the pipe and the percent of slope (to 4 significant digits). Also, show the catch basin type and size, the station and offset, and a cross reference to the storm drain plan and profile sheet where the catch basin is shown.
2. All existing utilities crossing the proposed pipe will be shown at their proper location and elevation. Use as-built drawings to obtain the correct elevation. When elevations are available from as-built plans, the elevation should be called out on the profiles. Where no elevations are available, the utility will be located from the best available information.
3. A note should be included on each sheet stating that the elevation is unknown, unless noted on the profile. Where elevations of existing utilities are not known and their existence could be in conflict with the proposed pipe or catch basin, to determine exact elevations and horizontal locations, the consultant must coordinate digging potholes with the respective utility company.
4. Utilities located in the field will be shown in plan and profile at their correct location, and noted in profile with their exact elevation and the notation "potholed elevation".
5. Minimum vertical clearance between the proposed pipe and all existing utilities, other than Salt River Project (SRP) pipe, will be per MAG Standard Specifications or the COS MAG Supplement (www.scottsdaleaz.gov/design/COSMAGSupp). SRP requires a 2-foot horizontal clearance with underground utility lines, poles, fences, buildings, etc., and 1-foot vertical clearance with underground utilities. On special occasions they will permit 3 inches of horizontal clearance with catch basins.
6. Utilities that will require relocation will be noted in the cross sections and shown at the existing and new locations.
7. All required pipe collars and pipe supports will be called out on the cross section. Prefabricated tees will be utilized whenever possible.

9-1.407 IRRIGATION PLAN, PROFILE AND DETAIL SHEETS

A. Sheet Orientation

Sheets will have the same orientation as the paving plan sheets.

B. Topography and Notation

Paving removal items will be called out on the paving sheets, not on the irrigation sheets. When Salt River Project does its own construction, removals to be done by SRP forces will be called out on the paving sheets and it shall be noted that they will be removed by SRP. Construction items for irrigation work will be called out on the irrigation sheets. If SRP is to do its own construction, the construction items will be listed and noted as such.

C. Horizontal Alignment and Design

1. Private irrigation pipe, ditches, and structures will be placed on private property using a temporary construction easement. The private irrigation pipelines may be placed under the proposed sidewalk if placing pipe on private property would result in the loss of existing trees or landscaping, or cutting of planters or buildings or concrete pavement parking areas, and if there is no conflict with SRP.
2. SRP irrigation pipe may be placed under the proposed sidewalk; however, their structures are to be placed on city rights-of-way, behind the sidewalk.

3. In locating private or SRP pipe, care should be used to allow space for utility poles, streetlights, or traffic signal pole bases along the property line, and sufficient horizontal clearance between any structures and the proposed pipe.
4. The consulting engineer, at the earliest opportunity, shall notify the SRP, in writing, of the project and request a design schedule and estimated design cost. A copy of this request and the proposed schedule must be sent to the city. The consultant will provide the SRP with all available information on the location of other utilities, street grades, and street alignment. The consultant will cooperate with SRP so that the final design will meet their standards and be the most economical for the city.
5. At the same time they are submitted to the city for review, the consultant will send a set of grade and alignment plans to SRP and request a determination of rights-of-way requirements for their facilities. It is essential in order to meet rights-of-way schedules that these rights-of-way requirements be submitted to the city as soon as possible.
6. A second set of grade and alignment plans will be sent to SRP after approval by the city. Based on these plans, SRP can proceed with the design. SRP will prepare a red-line preliminary design and transmit it to the consultant. The consultant will review the red-line preliminary design and return it, with comments, to SRP as soon as possible. SRP will then complete the final design.
7. If existing private or SRP irrigation pipes are to remain as is, the consultant will investigate the type of pipe and its condition to ensure it is fit to remain. The consultant will also investigate the elevation of the pipe to be sure enough cover will be provided over the pipe even during the time of construction. The consultant must meet with SRVWUA to determine what requirements should be met for the project.
8. On private irrigation lines and ditches, the consultant must obtain the delivery quantities and irrigation schedule from the Water Master. The consultant will be completely responsible for the design of private irrigation systems. The determination of rights-of-way requirements at an early date is essential in maintaining the time schedule; submit these requirements to the city as soon as possible. Hydraulic computations on private irrigation will be furnished to the city. All work involving private or SRP irrigation will be coordinated with the city's project manager.
9. SRP typically constructs its own facilities, therefore, the consultant will show SRP's design on the plan of the paving sheets and properly note which work shall be done by the city's contractor and which will be done by SRP. Mylar plans of SRP work are to be placed at the end of the construction plans for a permanent record.

D. Profiles and Grades

Profiles shown for irrigation pipes must show the proposed surface grades over the centerline of the pipe as well as the invert profile of the pipe and the top of the pipe. Top elevations must also be shown for all irrigation structures. Grades of pipe shall be established, which will provide sufficient cover over the pipe and will also work efficiently hydraulically.

SANITARY SEWER PLAN, PROFILE AND DETAIL SHEETS 9-1.408

A. Sheet Orientation

Sheets will have the same orientation as described in the paving plans section.

B. Topography and Notations

1. Provide the same siting information as required for the paving plan base sheets for the sanitary sewer plan sheets.

2. If the sewer is located in an easement outside the rights-of-way, show all existing site conditions to 30 feet minimum along each side of the pipeline.

C. Horizontal and Vertical Control

1. Establish one construction benchmark for every 1000 feet minimum along the alignment of the pipeline. At least two city benchmarks should be referenced (NAVD 88).
2. Stationing will be established along the pipeline, will increase from lower to higher invert elevations, and be referenced to street centerline or monument lines at manholes or angle points where possible. Where not possible, the use of bearings and distances along the pipe centerline will be utilized. The beginning and end point of the sanitary sewer line will be tied to the nearest monument point.

D. Soils Testing

1. Prepare the geotechnical investigation as described in Section 9-1.100.
2. Additionally, provide soils boring logs at a minimum spacing of 1320 feet along projects whose average trench depth exceeds 10 feet. Boring should extend to 24 inches below the proposed bottom of the trench and be of sufficient diameter to allow for laboratory testing and analysis. Locations of borings will be identified on the plans. Soil boring logs will be included on a geotechnical report along with a discussion of any particular bedding, shoring, excavating, or dewatering considerations.

E. Profiles and grades

1. Profiles will indicate the existing and design grade line over the pipe and will include the "as-built," "field-verified," or "potholed" locations of all crossing utilities.
2. Vertical locations of storm drains and sanitary sewers should be interpolated from verifiable field elevations along accessible points. Locations of other pipes shall be taken from information on existing "as-built" drawings or actual field "pothole" datum.
3. When existing "as-built" plans of a water line greater than 12 inches diameter, a high pressure gas line greater than 4 inches diameter, and telephone or electrical conduits do not indicate a depth of bury, the engineer must coordinate with the utility company for a “pothole" location to be provided. When existing "as-built" plans of a water line, a gas line, or telephone or electrical conduits do not indicate a depth of bury, the engineer will coordinate with the utility company to provide a "pothole" location.
3. Identify existing utilities by name, size, and type of pipe in the profile. If existing or proposed pipes are greater than 21 inches (inside) diameter, show top and bottom invert grade line and an indication of pipe wall thickness in the profile. For pipes 21 inches or smaller (inside) diameter, indicate only top and bottom invert grade.
4. Necessary water relocations will be per COS Detail No. 2370. Coordinate requirements for shut-off and air release/vacuum valving with the city Water Resources Department.
5. Show invert and rim elevations on all manholes, and pipeline invert elevations on all ends of stubouts or at points of match sheet. Pipeline grades should be established to four decimal places.
6. Calculate invert elevations and lengths of pipe from center of manhole to center of manhole. Sections of pipe connected to manholes should be 5-foot maximum length to minimize the adverse affects of any settlement.

9-1.409 WATER LINE PLAN, PROFILE AND DETAIL SHEETS

Sheet orientation, topography and notations, horizontal and vertical control, and soils testing should be similar to those criteria described for the previous section "Sanitary Sewer Plans, Profiles and Details".

A. Profiles and Grades

1. Profiles are required for all waterlines 12 inches and greater.
2. Profiles will indicate the existing and design grade line over the pipe and shall include the "as-built," "field-verified," or "potholed" locations of all crossing utilities.
3. Vertical locations of storm drains and sanitary sewers will be interpolated from verifiable field elevations along accessible points. Locations of other pipes will be taken from information on existing "as-built" drawings or actual field "pothole" datum.
4. When existing "as-built" plans of a water line, a gas line, or telephone or electrical conduits do not indicate a depth of bury, the engineer will coordinate with the utility company to provide a "pothole" location.
5. Identify existing utilities by name, size, and type of pipe in the profile.
6. Existing water line relocations may be necessary and shall be per COS Detail No. 2370. Minimum separations between water lines and electric/gas lines shall be per city of Scottsdale Detail No. 2372.
7. Construct all fire line services and hydrant connections with DIP.
8. Water mains 12 inches in diameter will have a minimum cover of 48 inches to finish grade; mains smaller than 12 inches in diameter will have a minimum cover of 36 inches to finish grade; mains greater than 12 inches in diameter will have a minimum cover of 60 inches to finish grade. Water mains in industrial areas or in major collectors and arterials will have a minimum of 48 inches cover.
9. All bends, angle points, fittings will be stationed. On water lines 12 inches or larger in diameter, show the design top of pipe elevation. Cut stakes will be provided for the trenching of all water lines 12 inches or more in diameter.

TRAFFIC SIGNAL PLAN, SCHEDULE AND DETAIL SHEETS 9-1.410

A. Plan Sheet

See Section 5-4, Traffic Signal Design, for specific information on plan sheet sets. Plan submittals and plan content are described in Sections 5-4.200 and 5-4.300.

B. Notes and Schedules

Develop these as necessary to show the conductor schedules, controller and pole schedules, phasing details, etc., and general notes (see Figure 5.4-3) with cross references to items shown on the plan sheet. Refer to Section 5-4 for further guidance.

TRAFFIC SIGNING AND PAVEMENT MARKINGS 9-1.411

A. Sheet Format

Use double plan at 1 inch = 40 feet scale, the same orientation as the paving plans.

B. Plans

1. Signing and striping will conform to ADOT Specifications and Standard Drawings and the Manual of Uniform Traffic Control Devices, unless shown otherwise in COS design criteria and standards, or as directed by the Traffic Engineering Program.
2. Existing striping will be shown and dimensioned to a minimum of 300 feet beyond where it ties into the new work. All new work will be appropriately dimensioned from lip of gutter to center of stripe, etc. Overall dimensioning will be provided across pavement widths and rights-of-way. See Section 5-4 for a list of applicable notes to place on plans.

3. All permanent pavement striping, including crosswalks, will be hot sprayed 6 mil thermoplastic. Temporary pavement markings and island noses should be reflectorized traffic paint. Legends and arrows to conform to ADOT Specifications and Standard Drawings.
4. Raised pavement markers are generally required for all new COS paving projects.

9-1.412 LANDSCAPE AND LANDSCAPE IRRIGATION PLANS

A. Sheet Format

Landscaping and irrigation may be combined on the same plan for simpler projects, but generally require separate plan sheets. In either case, the orientation and scale will be the same as for paving plans, using a double plan on each sheet.

B. Note and Legends Sheet

This sheet may be combined for the landscaping and irrigation plans. It will contain general notes, landscaping notes, irrigation notes, list of plants and shrubs used (noting common and botanical names), list of irrigation components, legends of landscape and irrigation symbols, quantities, approval block, maintenance statement, and miscellaneous details. If the project goes before Development Review, the DR number will be placed on the right hand lower corner of each sheet.

C. Plan Sheets

1. Landscape plans will show individual shrubs and trees plus types and areas of various ground cover, including grass, decomposed granite, pavers, exposed aggregate paving, etc., with quantities shown on the right hand column. Identify restoration work behind new sidewalks, or in other areas disturbed by construction work. Existing items to be removed or transplanted will be shown with special attention to native plants that are required to be salvaged. The city will furnish guidance and assistance in identifying plants to be salvaged or transplanted as well as selecting types of new plants that will conform to the city landscaping policy and to the requirements of the Arizona Department of Water Resources for the Phoenix Active Management Area.
2. Sight lines will be shown on the landscaping plans and will conform to COS criteria and standards. Design consideration should be given to placement of plants, size of plants at maturity, canopy widths, and general maintenance. Generally, shrubs should be kept a minimum of 4 feet away from the curb or sidewalk, and when within a sight line they should not exceed a maturity height of 24 inches above the curb.
3. Trees should be located so that the mature canopy will not overhang the curb or sidewalk line. Within a sight line, trees will have a single trunk with a clear height of 7 feet to the canopy.
4. Irrigation plans will provide detailed design from the service side of the meter. The irrigation service and meter will be provided and noted on the civil plans.
5. Identify the detail and dimension, or station the locations and layout of the meter, backflow preventer, control valves, main and lateral lines, pressure regulator, emitters, etc. Diagrammatic layout plans will not be accepted by the city. The consultant will clearly indicate with stations, and dimension to the back of curb or sidewalk the proposed locations of the irrigation components.
6. Separate emitters will be shown to each plant. Typical planting details will show an emitter location at each plant. Multi-port emitters will be allowed on each tree with a maximum of 4 leads of plastic drip tubing, 36 inches in length.
7. Show the electrical source plus the controller location and all wiring, including conduits and sleeves. Details for the controller cabinet installation and a schematic of the electric service are shown on COS Standard Detail 2630.

8. Upon request, the city will provide the consultant a listing of products that may be listed for performance and quality control. The drawings need to reference "or approved equivalent" in all cases.

BRIDGE AND STRUCTURAL PLANS AND DETAILS

9-1.413

At the city's option, bridges on canals may be designed as a separate contract to be bid separately from the roadway plans, since the bridge must be built during the annual canal dry-up. Bridges over washes may be included as part of the paving plans.

A. Required Sheets

The sheets required on a typical set of bridge plans, which are independent of the roadway plans, are shown in Figure 9.1-8 below.

REQUIRED SHEETS FOR BRIDGE AND STRUCTURAL PLANS	
1	City cover sheet with information as shown under paragraph A.
2	Typical section sheet to show sections of roadway work included.
3	Notes and legend sheet with information shown under paragraph B with additional bridge and structural notes.
4	Paving plans and profile sheet with additional information concerning bridge and structural details.
5	Detour plan and profile, if required, showing all details required for the detour in plan and profile.
6	Plan and profile for any water, sewer, or irrigation alterations to be included as part of the bridge contract.
7	Bridge location plan showing the bridge in plan and profile and the bridge quantities.
8	Soil boring log sheet showing all soils information obtained and the note concerning responsibility.
9	Abutment Details.
10	Pier Details.
11	Deck Details.
12	Miscellaneous details (approach ramps).
13	Handrail and Guard Details.

Note: Sheets 7 through 13 described above would be consecutively numbered S1, S2, etc. if incorporated into a roadway project.

FIGURE 9.1-8. REQUIRED SHEETS FOR BRIDGE & STRUCTURAL PLANS

B. Additional Requirements

1. The consultant will discuss the project with SRP at an early date in order to obtain their requirements when designing a bridge over a canal or when any SRP facilities are involved. Generally, the first step of a bridge design over an SRP canal will be to obtain a statement from SRP as to whether they consider the bridge a restriction in the canal. If they do consider it a restriction, it will be necessary for the engineer to submit a hydraulic study to SRP to assure that construction of the new bridge or bridge widening will not adversely affect hydraulic characteristics in the canal. Upon approval of that study by SRP, the consultant will proceed with preparation of preliminary plans. Following review and approval of such plans by the city and SRP, the consultant will

proceed to drafting final plans. Throughout all stages of project design, the consultant will coordinate all work with SRP in order to minimize any possible conflicts. Bridges over SRP canal facilities must conform to prevailing SRP standards and requirements.

2. Consultant will consider sight distance requirements when designing the roadway portion of the contract.
3. At an early date, the consultant will coordinate with other utilities such as Qwest, SRP, APS, Southwest Gas, Cable TV, and the COS Water and Wastewater Department in order to identify any necessary relocations of their facilities.

9-1.414 PLAN SHEETS BY OTHERS

1. Private electrical, gas, telephone, and cable television facilities may need extension, upgrading, or relocation as a result of this project.
2. Where possible, reproducible copies of utility agency designs should be attached to the end of the plans that are set and labeled “For contractor reference and information only - work to be done by others.”
3. There may be situations where the contractor is required to provide trenching and conduit installation for a utility company. Such work should be clearly described in the Special Provisions.

9-1.415 RIGHT OF WAY PLANS

A. Strip Map

Strip maps will be at a scale (generally 1 inch = 100 feet) sufficient to differentiate the various easements and parcels. Format should be shown on a 24" x 36" sheet. Show each parcel abutting the project and indicate proposed and existing dimensioned rights-of-ways, easements, ownership, and areas.

- Format: 24” x 36” per city
- Scale: 1 inch = 100 feet
- Property addresses and occupants identified
- Property owners identified
- Existing easements and ROW identified
- New easements and ROW to be acquired identified

B. Parcel Exhibits

One exhibit per parcel is required. One exhibit per ownership may be submitted with approval from the COS Right of Way Agent. Prepare parcel exhibit maps on individual sheets and include a legend indicating the type of acquisition. The plan view should show the parcel boundary dimensioned to section corners (non-subdivided lots), adjacent rights-of-way centerline, any onsite improvements, along with all existing and proposed easements and rights-of-ways clearly identified and dimensioned. The identification of existing rights-of-way and easements should include the appropriate county recording information.

- Format: 8-1/2” x 11”
- Title block at lower right identifying the city's project, project number, tax parcel number, and the property owner(s).
- North arrow and scale
- 1/4 section ties
- Property addresses and occupants identified

- Existing easements and ROW identified
- New easements and ROW to be acquired identified
- Individual areas noted
- Parcels dimensioned and bearings

C. Parcel Descriptions

The individual parcel descriptions for all new easements and/or rights-of-way will be prepared by or under the direct supervision of a land surveyor registered in the State of Arizona and be sealed by the same. All parcel descriptions shall be typed on separate 8-1/2" x 11" formats and will be consistent with APLS standards. See Figure 9.1-9 for a sample exhibit.

The description should be typed in single space format and double spaced between its various parts as outlined below:

1. Caption

   Brief introduction stating location of parcel, portion of a subdivision, aliquot portion of sectional breakdown, township, and range.

2. Body
   - Tie true point of beginning to an established section corner, identifying its character
   - Metes and bounds courses
   - Identify boundary lines of joiners, citing Maricopa County Recorders numbers and pages
3. Area of easement or ROW, stated to nearest square foot and 10,000th ac.

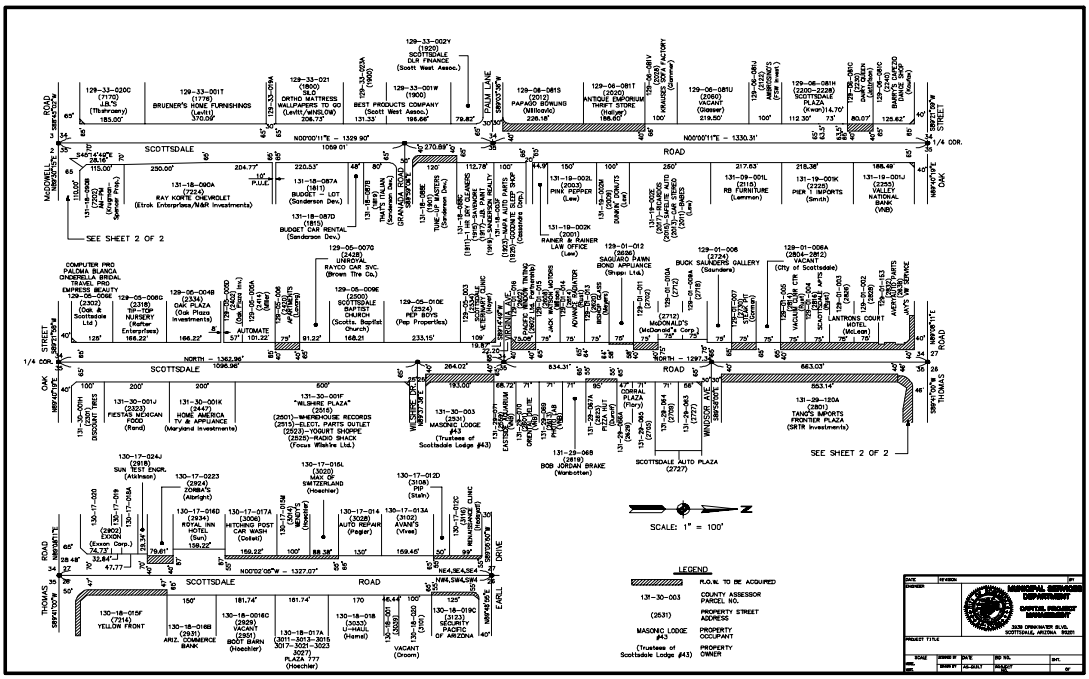

FIGURE 9.1-9. SAMPLE ROW EXHIBIT

CAPITAL PROJECT PLAN REVIEW PROCESS

Improvement and Facilities Projects

A. Review Submittals

1. Infrastructure Projects
   a. Concept Submittal / Preliminary Drainage Study
   b. First Submittal (Grade & Alignment review)
   c. Right of Way Submittal
   d. Second Submittal (Progress plans)
   e. Third Submittal (Completed plans)
   f. Approval Submittal (Sealed plans 100% complete)
2. Facilities Projects
   a. Schematic\Program Design
   b. Design Development
   c. Construction Documents (90% Complete)
   d. Final Const. Documents (Sealed Plans 100% complete)

B. Develop Project Review Schedule

1. Establish project review schedule using division monthly report.
2. Verify project submittal dates with Project Manager.
3. Coordinate project review schedule with One Stop Shop Final Plan Review.
4. Update and review schedule monthly.

C. Pre-Submittal Preparation (prior to a scheduled project submittal)

1. Verify submittal date with Project Manager.
2. Coordinate with COS staff members involved in the review process (see below) and establish timeframes for their participation:
   a. Designated One Stop Shop Final Plan Review staff member: for project components deviating from design criteria or General Plan.
   b. Floodplain Administrator or his designee: for preliminary drainage study compliance with floodplain management policies.
   c. Traffic Engineering Director or his designee: for approval of traffic-related deviations from Master Plan, and reviewing signalization, striping, signing and counter loop locations.
   d. Field Services: for review and input on landscaping and irrigation systems.
   e. Field Services: for review and input on pavement, signing and striping designs.
   f. Facilities Maintenance: for review and input on all City-maintained structures and/or equipment.
   g. Water Resources: for projects with any facilities, main transmission, supply or trunk lines.
   h. Right-of-Way Agents and City's appraiser: for reviewing right-of-way submittal.
   i. Planning: for theme districts or roadway landscaping.

CAPITAL PROJECT PLAN REVIEW PROCESS

Improvement and Facilities Projects

D. Project Review Timeframe

(usually two weeks from date of plan submittal to Project Manager)

1. Upon receipt of plans, confirm review dates with other involved COS staff, provide documents for their review, and apprise them of review completion deadline.
2. Obtain design criteria from Project Coordinator.
   a. Scope of work from contract.
   b. Minutes of meetings that contain design criteria determination.
3. Perform plan review for:
   a. Compliance with Master Plan.
   b. Compliance with plan format in accordance with the Project's Scope of Work.
   c. Compliance with minimum technical requirements for particular submittal per City's criteria and applicable standard specifications and details.
   d. Technical accuracy.
   e. Constructability.
   f. Value Engineering.
   g. Right-of-way utilization.
   h. Compliance with COS Codes.
4. Coordinate comments with those of City Departmental reviews.
   a. Schedule a meeting to resolve any conflicts in review.
   b. Arrange for any required departmental input on comments.
5. Complete CPM Review comment form and incorporate with One Stop Shop Final Plan Review's comments.
   a. Add to CPM's redlines the outstanding comments from One Stop Shop Final Plan Review for a single presentation of City comments.
6. Return copy of comments to Project Manager.
   a. Project Manager to schedule a review conference with the Consultant.
   b. Coordinate with any COS staff to be present at review conference.

E. Post Review Activity

1. Attend conference with consultant and Project Manager to resolve review issues.
2. File review documents.

public works
& facilities

FACILITIES PLAN REQUIREMENTS

9-2

This section specifies the submittal and review process and requirements for public facilities, including plan sheet numbering, sequence, and contents.

Capital Projects
7447 E Indian School Road
Suite 205
480-312- 7250

Municipal Services
9191 E San Salvador Dr
480-312- 5550

One Stop Shop
7447 E Indian School Road
Suite 100
480-312-2500

Current Planning
7447 E Indian School Road
Suite 105
480-312-7000

Plan Review
7447 E Indian School Road
Suite 105
480-312-7080

Fire Department Plan Review
7447 E Indian School Road
Suite 125
480-312-7080

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FACILITIES PLAN REQUIREMENTS

9-2

GENERAL INFORMATION 9-2.000

STANDARDS AND CODES 9-2.001

- International Building Code 2003
- International Mechanical Code 2003
- Title 34, Arizona Revised Statutes regulating public buildings and improvements
- National Electrical Code 1999
- Uniform Plumbing Code 1994
- International Fire Code 2003

DESIGN POLICIES AND GUIDELINES 9-2.002

- Project stipulations from the Development Review Board
- Other general acceptable design standards, policies, and guides

GENERAL REQUIREMENTS 9-2.003

See Appendix 9-1A for the plan review process.

1. Make sure that plans are standard 'D-sized' (24" x 36") sheets unless prior approval has been obtained from the city to use the larger 'E-sized' (30" x 42") sheets. All sheets must be clearly reproduced on Diazo print paper in blue or black line format.
2. Upon request, the city will furnish the consultant with electronic files of base drawings shown in the figures at the end of this section. The consultant will be responsible for completing the drawings as applicable for the project.
3. Place a standard city title block in the lower right hand corner of each sheet. Also, show the architect's identification/ logo, along with that of any sub-consultant, along the right edge or upper right corner of the sheet.
4. Make the minimum lettering size 3/16 inch for manually drafted or 1/2 inch for mechanically produced lettering, and ensure it is legible when reduced 50 percent. Reproduction of final drawings must be legible when microfilmed or reduced to 1/2 scale. Capital Projects Management (CPM) Plan Review determines the legibility of all drawings submitted. Adhesive backed appliques for lettering and shading will not be permitted without approval of CPM Plan Review.
5. On all sheets with maps or plans, orient North to the top of the sheet. A north arrow and scale must be on all applicable sheets.
6. Keynote all construction notes. Group construction keynotes referencing to a specific symbol (square symbols designate demolition and removals, diamond symbols designate relocations, and circular shapes designate construction items.
7. The designer responsible for the design must seal all plans and documents submitted for review, and mark them: "For Review Purposes, Not To Be Used For Bidding Or Construction." Submitted plans and documents must also be signed by the registrant when the submittal reaches the level of 90 percent or better.
8. All projects must comply with Section 404 of the Federal Clean Water Act. Before the city may issue development permits for a project, the 404 Certification Form must be

completed and submitted with improvement plans to the CPM Design and Plan Review staff (www.scottsdaleaz.gov/design/dspm/forms). Consultants are advised to apply to the Corps as early as possible for a Section 404 permit and allow for the necessary processing time to prevent delays in obtaining development permits from the city.

9. Make sure all projects submitted for review and/or further processing are complete and consist in plans, specifications, structural calculations, mechanical, calculations, plumbing calculations, electrical calculations, geotechnical report, drainage report, native plant information, and other documentation as required for that project.
10. The designer must submit a minimum of 4 full size sets of drawings, 2 sets of specifications, and 1 set of other documents as required. In addition, the designer will provide additional plans, specification, and other documents as required for internal user group review purposes.
11. Provide an electronic copy of the final plans and specifications in MicroStation Format.

9-2.100 PLAN SHEET NUMBERING & SEQUENCING

Sheets will be identified by design discipline as designated below, and consecutively numbered. Additionally, final consecutive numbering of the entire set of plans should be provided on each sheet. The sheet numbering prefixes shown in Figure 9.2-1 are commonly used, and the consultant will review the sheet sequencing and/or intended numbering with the city's project manager.

PLAN SHEET NUMBERING & SEQUENCING

Plan sheet prefixes:

G = General	L = Landscape	S = Structural	P = Plumbing
C = Civil	A = Architectural	M = Mechanical	E = Electrical

Plan sheets shall be sequenced as follows:

1	G1	City cover sheet
2	G2	Notes, legend, approval blocks, and notations
3	C1	Existing site survey
4	C2	Civil grading and drainage plans
5	C…	Civil site utility plans
6	L1	Landscaping and irrigation plans
7	A1	Architectural site plan
8	A2	Architectural plans, elevations, sections, details, schedules
9	S1	Structural general notes
10	S2	Structural plans
12	M1	Mechanical legends, notes, abbreviations
13	M2	Mechanical plans, details, schedules
14	P1	Plumbing plans, details and diagrams
15	E1	Electrical legends, notes, abbreviations
16	E2	Electrical site plan
17	E3	Electrical plans, schedules and details

FIGURE 9.2-1. PLAN SHEET NUMBERING & SEQUENCING

DETAILED SHEET INFORMATION 9-2.200

COVER SHEET 9-2.201

The city will furnish an electronic drawing file of the cover sheet upon request (see Figure 9.1-1). The Engineer will add the following:

1. Project title, CPM project number, bid call number.
2. Vicinity map with section, township, range, and parcel numbers.
3. Sheet index
4. Engineering company identification and engineer's seal
5. Other agency approval blocks as applicable
6. City benchmarks for project – a minimum 2 required on COS datum.
7. Applicable city assigned plan review, development review, and native plant numbers assigned by Project Review when submitted.
8. Listing of applicable codes, City Ordinance, and amendments.

NOTES, LEGEND AND KEY MAP SHEETS 9-2.202

1. Key Map - Show all intersections, rights-of-way, and key to all plans with stations
2. Legend of symbols used for existing and design elements
3. List of abbreviations used in plan set (other than as shown in the MAG Specifications)
4. Include Figure 9.1-4, General Construction Notes for Public Works Construction in addition to any special project notes generated.

public works & facilities

BUILDING STANDARDS

9-3

This section identifies desired products for plumbing, doors and hardware, building components, HVAC, and electrical systems for constructing or altering existing city facilities.

Facilities Management
9191 E San Salvador Dr
480-312- 5999

Capital Projects
7447 E Indian School Road
Suite 205
480-312- 7250

Municipal Services
9191 E San Salvador Dr
480-312- 5550

One Stop Shop
7447 E Indian School Road
Suite 100
480-312-2500

Plan Review
7447 E Indian School Road
Suite 105
480-312-7080

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BUILDING STANDARDS

GENERAL INFORMATION

New construction documents for new construction or alterations to existing facilities shall call for the use of items, components, materials, or types of systems outlined in this chapter. Specific brand names, manufacturers, and model numbers are referenced for the purpose of indicating the quality, type, style, and function that is desired. Where specific brand names are indicated, other products may be submitted for consideration as an approved alternate. Such submittals will be reviewed and may be approved as acceptable alternates. Specifications of products that have not received prior approval by the Facilities staff shall not be permitted.

FACILITY TYPES

General Use Buildings	Vandal Resistant Facilities	Miscellaneous Structures
Office Buildings	Park Restroom Facilities	Bike Path Tunnels
Libraries	Public Transit Facilities	Bike Path Drinking Fountains
Recreation Centers	Park Ramadas	Bike Path Lighting and Controls
Solid Waste Transfer Stations	Parking Lot Shade Structures	
Water Reclamation Plants		
Maintenance & Warehouse Buildings		

FIGURE 9.3-1. FACILITY TYPES

PLUMBING SYSTEMS

A. PIPING

1. DRAINS

a. Cast iron soil pipe is allowed.
b. Acrylonitrile-Butadiene-Styrene (ABS) Drain, Waste, and Vent (DWV) pipe is allowed, when permissible by code.
c. Connections between ABS pipe and Cast Iron pipe, fixtures or fittings shall be made with approved transition couplings.
d. Drains shall be installed at minimum 1/4 inch per foot fall.
e. Cleanouts required at all sinks and urinals. Cleanouts not flush with wall shall be extended to wall from waste stack with combination wye and 1/8 bend or bends of equivalent sweep. At no time shall cleanouts be concealed.

2. VENTS

a. Cast iron soil pipe is allowed.
b. ABS DWV pipe is allowed, when permissible by code.
c. Vandal resistant vent caps shall be installed in vandal resistant facilities.
d. Air admittance valves are prohibited unless pre-approved.
e. All substitutions must be pre-approved.

3. SEWER

a. ABS/DWV schedule 40 pipe is allowed with approved drainage fittings.
b. Standard dimension ratio (SDR) pipe 6 inches and above is allowed with approved drainage fittings.
c. Yard clean out to have threaded cap below cast iron sewer traffic cover with concrete apron. 12" x 12" square.
d. Clean outs shall be located every 90 feet, horizontal length.
e. Clean outs in concrete shall have nickel bronze covers.
f. Provide two cleanouts outside of each building with opposing combination wye and 1/8 bends.
g. Sewers shall be installed at minimum 1/4 inch per foot fall. Slopes of minimum 1/8" per foot may only be allowed if structural conditions prohibit 1/4 inch per foot slopes and must have permission of the Building official.
h. All substitutions must be pre-approved.

4. DOMESTIC WATER

a. Type "L" hard drawn copper shall be used above ground.
b. Type "L" soft drawn or hard drawn copper may be used below ground outside of buildings.
c. Type "K" soft drawn copper may be used below ground under buildings (only where necessary).
d. Yard piping - Type "L" copper. 1-1/2" and larger shall be connected with Ford pack joints.
e. PVC is not permissible for domestic water piping for Scottsdale facilities.
f. Pressure regulators equipped with bypass and isolation valves with brass unions are required on all buildings. Acceptable valves are Watts U5B-S, Wilkins 70-DUC.
g. All branch lines shall be valved, i.e. evaporative coolers and auxiliary equipment.
h. Valves shall be full port ball valves through 2". Valves 2-1/2" and larger shall be butterfly valves with worm gear operator.
i. Underground valves up to 2" shall be brass with rectangular operating stem.
j. All substitutions must be pre-approved.

5. SOLDER

a. Solder shall be lead free.
b. Flux shall be non-acid and joints shall be wiped clean.
c. All substitutions must be pre-approved.

6. HVAC SYSTEMS

Where a single backflow preventor feeds 2 or more areas such as a cooling tower and a chilled water loop, dual checks with unions shall be installed on each to prevent water from one area flowing to another area. Prefer Watts #7, suffix U or equal.

7. FIRE SYSTEMS

A double check valve is required in accordance with Scottsdale's Backflow Ordinance #2346 (www.scottsdaleaz.gov/codes) unless entire system is of potable piping and fittings.

B. FIXTURES

1. WATER CLOSETS

a. Water closets shall be top spud, wall mount, blowout elongated bowl with flushometer valve and white solid plastic seat. Acceptable models are Kohler K-4450-C, Eljer Tacoma 111-0355, American Standard Instanto 2512.010, Kohler Stratton K-4450-C, and Crane Rapidway 3460. Flush valves shall be Zurn, Sloan or approved alternate.

b. Vandal resistant buildings shall have wall hung stainless steel water closets with white solid plastic seat, and thru wall sleeve. Acceptable models are Acorn 1675-T-1-FV or pre-approved alternate. Flush valves shall be Zurn, Sloan or approved alternate.

c. When tank types are required for reduced water piping size, they should be dual flush with a dimension of 4 inch trap way or greater; with 0.8/1.6 gallons per flush (gpf). Tank type toilets shall not to be used in vandal resistant buildings.

d. Closets shall be hung on approved carriers. Carriers shall be mounted to concrete slab per manufacturers recommendations, including size and quantity of bolts.

e. Wall hung closets shall be set with felt gaskets.

f. All substitutions must be pre-approved.

2. URINALS

a. Urinals shall be wall hung, top spud, blow out type. Acceptable models are Eljer Correcto 161-1060, American Standard Lynbrook 6601.012. Flush valves shall be installed as per code not less then a 6 inch minimum vacuum height with a 1-1/4 inch tail piece. Acceptable models are Zurn, Sloan or approved alternate.

b. Vandal resistant buildings shall have stainless steel straddle type blowout urinals. Blowout urinals shall be Acorn # 1705-T-1-FV or pre-approved alternate. Flush valves shall be Zurn, Sloan or approved alternate.

c. Flush valves shall be installed as per code not less then a 6 inch minimum vacuum height with a 1-1/4 inch tail piece.

d. Where practical and after approval water-less urinals in compliance with the Americans with Disabilities Act (ADA) and Uniform Plumbing Code (UPC) shall be installed with water supply capped and available in wall cavity at a location near or at rough-in measurement pursuant to manufacturers recommendation for water supply. Request for code variance shall be required to use water-less urinals.

e. All substitutions must be pre-approved.

3. LAVATORIES

a. Counter top lavatories shall be enameled cast iron with stainless steel rim set into counter. Acceptable models are Eljer Clement 052-0244, Kohler Tahoe K-2890

b. Wall hung lavatories shall be enameled cast iron. Acceptable models are Eljer Bucknell #052-0197, Kohler Hudson, K-2861.

c. Lavatories shall be punched for 4-inch center set faucet.

d. Faucets shall be Moen 8470 or pre-approved alternate.

e. Valves shall be Aquaflo E-Z Turn Ball Valve stops # V-101-A or approved alternate.

f. Strainers shall be grid type strainers with offset traps, ADA compliant when required.
g. All substitutions must be pre-approved.

4. SINKS

a. Minimum 18-gauge stainless steel, kitchen sinks shall be four hole with fourth hole plugged if not used initially. Brass body basket strainer shall be Dearborn #16 or approved alternate. Sinks used in general use areas for employees or the public shall meet ADA guidelines. Sink shall have a 6-inch depth; with drain connections in the back of sink in a cabinet designed for wheelchair access. Acceptable models are Elkay Model ADAR-3321 two bowl sink and Elkay model ADAR-2521-L single bowl sink. ADA sinks shall have an Elkay Model LK-35L strainer with elbow. Valves shall be Aquaflo E-Z Turn Ball Valve stops # V-101-A or approved alternate.
b. Mop sinks –shall be floor type Fiat #897 or approved alternate. Faucets shall be Chicago #897 with integral stops, vacuum breaker and wall supports. Stainless steel splash shields shall be installed on all walls adjoining the mop sink.
c. Multiple wash stations shall be installed as per manufacturer's recommendations and specifications.
d. Bar sinks shall be Elkay Model with Moen 8901 faucet. Valves shall be Aquaflo E-Z Turn Ball Valve stops # V-101-A
e. All substitutions must be pre-approved.

5. DRINKING FOUNTAINS

a. All drinking fountains shall be equipped with MDF model #450 SS; chilled and dual height. If the site is one where children may gather, such as parks, libraries, recreation centers, etc., a third fountain shall be mounted at 28inches above ground to deck
b. Remote chillers shall be located within 3 feet of drinking fountains. Recirculating pump systems are not acceptable.
c. The preferred method of providing outside drinking fountains is to mount drinking fountains on a wall immediately adjacent a plumbing chase with a chiller and sand trap in the chase. If the preferred method is not available, a freestanding unit shall be used.
d. Freestanding outdoor drinking fountains shall be constructed to city specifications, patented design and will be provided by the city or city approved vendor of the patented design.
e. All drinking fountains will be chilled and provided with sand traps.
f. When required pet and horse water fountains will be installed per city specifications.
g. All substitutions must be pre-approved.

6. FAUCETS

a. Lavatory— faucets shall be single handle and of cartridge design Moen #8470.
b. Kitchen— faucets shall be single handle cartridge type, Moen #7200.
c. Bar sink— faucets shall be single handle cartridge type Moen #8901.
d. Mop sink— faucets shall be chrome plated, wall mount, with integral stops, vacuum breaker and hose threads, Chicago #897
e. Showers— faucets shall be pressure balanced with integral stops, Moen #8325 "Sani-Stream" of the vandal resistant type. Hand held shower valves shall be Moen #8345 "Sani-Stream" with brass quick disconnect coupler installed between vacuum breaker and hose.
f. Vandal resistant shower heads will be provided: "Bradley 1C-SF (445-SF).

g. Hose bibbs shall be Woodford 24P - 3/4-inch.
h. All substitutions must be pre-approved.

7. TRIM

a. Exposed traps shall be 17-gauge, chrome plated brass with cleanout and chrome-plated brass slip joint nuts.
b. All exposed tubular shall be 17-gauge, chrome-plated brass. All slip joint nuts shall be brass.
c. Extensions of exposed tubular trap arms shall be made with solder joint extensions only and at no time will offsets be allowed.
d. Angle stops shall be Aqua-flo EZ turn ball valves #V-101-A.
e. Concealed traps and tubular may be constructed of ABS.
f. Supply tubes shall be chrome plated nose formed type or flexible braded stainless only; corrugated supply tubes are not acceptable.
g. Cleanout covers shall be stainless steel or chrome-plated bronze with stainless steel screws.
h. Disposer shall be commercial grade 3/4 h.p. – ISE 777SS Pro.
i. All substitutions must be pre-approved.

8. PUMPS

a. Domestic hot water-circulating pumps shall be magnetic drive close-coupled pumps with stainless steel impeller Prefer Grundfos. Circulating pumps shall be installed with unions and isolation valves and controlled by an aquastat.
b. Storm water sump pumps shall have separate receiving basin to catch solids. Myers or JCH fractional vortex type pump shall be wired to a waterproof controller with a COS-compatible signal system and have both local and Metasys alarm capability.
c. Sewage ejectors shall be submersible Vortex type, with recessed impeller, packaged duplex systems with fiberglass tank, float switches, check valves and controls by same manufacturer. Myers, Tornado or JCH series are preferred.
d. All substitutions must be pre-approved.

9. TRAP PRIMERS

a. Trap primers shall be of type that is piped off of water closet flush valve tailpiece sleeve. Sloan F-72-A1 is the only acceptable model.
b. An electric timer shall operate trap primers not located near a flush valve; Precision Plumbing Products Model MP-500-115V or MP-500-24V or equal are recommended.
c. All substitutions must be pre-approved.

10. WATER HAMMER ARRESTORS

a. Water hammer arrestors shall be provided at each battery of fixtures with flush valves and shall be of the pressure-charged typed, sized to the manufacturer's specifications, and provided with an isolation valve and union. Approved Manufacturers are Watts, & J.R. Smith.
b. Access doors for valves, trap primers and water hammer arrestors shall be stainless steel and shall have a screwdriver latch.
c. All substitutions must be pre-approved.

11. FLOOR DRAINS

a. Floor drains shall have nickel bronze grate with Phillips screws (no vandal resistant screws).

b. Floor drains shall have removable sediment bucket in vandal resistant areas where debris may accumulate.
c. Vicinity floor drains that accommodate equipment, such as cooling tower discharge shall be sized to receive maximum flow rate at any time, or while other equipment is under routine operation. Drains used for other equipment and new equipment added during remodeling shall comply with the aforesaid.
d. All drains penetrations abandoned or newly installed during new construction or remodeling will be integrity tested for water tightness.
e. All substitutions must be pre-approved.

12. BACKFLOW PREVENTORS

a. Backflow preventors shall have bronze strainers installed upstream.
b. Install 1/4-inch flare fittings with flare caps in all test cocks.
c. Backflow preventors shall be installed per COS Standard Detail, available at www.scottsdaleaz.gov/design/detaildrawings.
d. Provide insulated cover on outdoor freestanding backflow preventors. Hotbox or equal.
e. Where a single backflow preventor feeds 2 or more areas such as a cooling tower and a chilled water loop, dual checks with unions shall be installed on each to prevent water from one area flowing to another area. Prefer Watts #7, suffix U or equal.
f. Fire Systems require a double check valve in accordance with Scottsdale's Backflow Ordinance #2346 (www.scottsdaleaz.gov/codes) unless entire system is of potable piping and fittings.
g. All substitutions must be pre-approved.

13. ROOF DRAINS

a. Roof drains shall have overflow and primary drain as a single flashed unit, except when overflow is thru a scupper.
b. Both primary roof drain and overflow shall have strainers.
c. Both primary and overflow roof drains shall continue separately to point of termination.
d. Roof drains shall terminate to daylight with a manufacturer's outlet fitting designed for and sized to properly drain with unrestricted flow. The piping shall slope at minimum ¼" per foot and shall not be trapped.
e. All substitutions must be pre-approved.

14. WATER HEATERS

a. Water heaters shall be installed as per manufacturer's recommendations.
b. All unions shall be brass type.
c. Expansion tanks and recirculation pumps shall be provided with isolation valves and unions located in a readily accessible area with a height no greater than 3 feet above grade.
d. At no time are water heater installations permitted above ceilings, attics, crawl spaces, cabinetry or voids where continuous occupancy is confined.
e. COS prefers Rheem/Rudd or other pre-approved alternate.
f. All solar installations are required to have an electric water heater system back-up sized per UPC with bypass capability to permit a quick transition to and from.
g. Instantaneous water heaters are allowed only with prior approval on make, size and location.
h. All substitutions must be pre-approved.

DOORS & HARDWARE SYSTEMS

9-3.200

A. HOLLOW METAL STEEL DOORS

1. General Requirements for Doors and Frames must comply with A250.6, A250.7, A250.8, and SDI-117.
2. Steel: Cold rolled steel shall comply with ASTM A 366. Galvanized steel shall comply with ASTM A 653 and A 924.
3. Primer Materials shall comply with Comply with ANSI A250.10 test procedures and acceptance criteria for prime painted steel surfaces for steel doors and frames.
4. Painted Finish Materials shall comply with ANSI A250.3 test procedures and acceptance criteria for factory-applied finish for steel doors and frames.
5. Door Color Paint Material shall be the manufacturer's standard finish and color.
6. Hardware Locations: Unless otherwise specified, conform to recommendations of Steel Door Institute or Door and Hardware Institute for location of locks, hinges, latches, push-pull plates and bars, exit devices, handle sets, closer reinforcings, roller latches, and arm pulls. There shall be a minimum of three butt hinges on doors over 60” high and not over 90” high and a minimum of four butt hinges on doors over 90” high and not over 120” high.
7. Louvers: Where specified provide factory-installed insert type louvers with vision-proof inverted Y baffles, louver blades 18 gage, frames 18 gage welded steel construction.
8. Primer: Finish exposed surfaces of doors and frames. Clean and treat with three-stage iron phosphate; provide one baked-on shop coat of EPA-compliant gray synthetic resin, rust-inhibitive alkyd enamel primer, which has been tested at a recognized independent testing laboratory in accordance with, and meeting acceptance criteria of, ANSI A250.10.
9. Factory finished paint shall be used where indicated: Such surfaces shall be chemically cleaned and treated, Provided with a heavy coat of electrostatically-applied baked-on finish paint providing good resistance in mar and abrasion tests and weather and chemical resistance.
10. Before beginning installation, verify that substrate conditions previously installed under other sections are acceptable for installation of doors and frames in accordance with manufacturer's installation instructions and technical bulletins. Verify door frame openings are installed plumb, true, and level. Select fasteners of adequate type, number, and quality to perform intended functions.
11. Set frames plumb, square, aligned, without twist at correct elevation.
12. Install frames plumb, straight, and true, rigidly secured in place and properly braced; comply with ANSI/DHI A115-IG ** NOTE TO SPECIFIER ** Coordinate subparagraphs below with manufacturer's installation instructions to avoid conflicts.
13. Comply with Door and Hardware Institute (DHI) installation standards. Comply with SDI-105 and SDI-124.Fire Doors and Frames: Install in accordance with NFPA 80, current edition, unless specified otherwise.
14. Frame Installation Tolerances: Tolerance for Plumbness is plus or minus 0.063 inch (1.6 mm) measured through a line intersecting corner of vertical members and the head to the floor. Tolerance for Squareness is plus or minus 0.063 inch (1.6 mm) measured through a line 90 degrees from one jamb at upper corner to opposite jamb. Tolerance for Alignment is plus or minus 0.063 inch (1.6 mm) measured on jambs, through a horizontal line parallel to plane of wall. Tolerance for Twist is plus or minus 0.063 inch (1.6 mm) measured at face corners of jambs, on parallel lines perpendicular to plane of wall.

15. Finish exposed field welds to present a smooth uniform surface; touch-up with rust inhibitive primer. Touch-up exposed surfaces scratched or marred during shipment, installation, or handling and field prime scratches or bare edges with a rust inhibitive primer. Before application of finish paint coat, ensure that surfaces are dry and free of dirt, oil, and dust. Apply finish coat over intact film, complying with application instructions of finish coat manufacturer. Install glazing materials and silencers.

B. WOOD DOORS

1. Wood doors shall be Architectural Woodwork Institute (AWI) Custom Grade.
2. Wood doors shall be used for interior use only.
3. Wood doors shall be solid core.
4. Lites in wood doors shall be no closer than 5 inches to the edge (6inches in fire rated doors. Openings for lites or louvers shall not be more than 40% of the surface area.
5. Finish work in the factory shall meet AWI Quality standards for custom standards.

C. STORE FRONT (Aluminum frame with glass)

1. Shall be medium 6-inch style
2. 10-inch top and bottom rails
3. Welded inner joints
4. Closer, surface mounted – Model LCN 4041
5. Lockset shall be Best (brand name) 7-pin removable core system.

D. AUTOMATIC DOORS

1. Swing type door – avoid automatic swing type doors when possible in new work.
2. Slider/Bypass – Typically specify Bi-parting with breakaway panels.
3. If building has emergency generator, automatic doors should be on generator back up.
4. Lockset to accept the city's BEST removable core system, and to have all metal internal parts.

E. OVERHEAD DOORS

1. Door Sections

a. Steel door sections will be 24 gauge, hot dipped galvanized steel. Sections shall be 2 inches thick.
b. Sections shall have an oven baked two-coat white polyester paint on both exterior and interior surfaces.
c. Double end stiles will be 18 gauge hot dipped galvanized steel and be pre-painted white to match sections. Stiles shall be riveted to the tongue and groove meeting rails and shall be bonded at 8 separate locations to the face of the section with a high impact/tensile strength adhesive.
d. Each section shall be roll formed with the RITS "Reinforced Integral Truss System" design.
e. The bottom section shall be reinforced with an aluminum bottom retainer that will support a reversing edge of the Miller edge type.

2. Track And Hardware

a. Track shall be 3 inch galvanized steel with reverse angle mounts to be used on masonry/steel jambs, or continuous mount angle when used on wood jambs.
b. Hinges shall be minimum 14-gauge steel.

c. 3-inch door struts shall be added to each door for added stability.
d. Horizontal tracks shall be reinforced with a 2-inch horizontal angle brace.
e. Torsion springs shall be oil-tempered wire engineered and calibrated to meet a minimum of 100,000 cycles. The spring shaft shall be a minimum of 1-inch solid steel shaft with center coupler.
f. Galvanized aircraft cable with a safety factor of 7-1 shall be used with the appropriate cable drums.
g. Insulation shall be expanded polystyrene with an r-factor of 7.35 or greater and shall be covered with a 26-gauge steel back skin when application requires.
h. Motor and hand chain shall be capable of being operated with a keyed switch for exterior access.
i. Doors to commercial grade as manufactured by Overhead Door Corporation or equal.
j. Electric operators will be draw bar type in standard lift applications where headspace above opening is less than 1 foot. Jackshaft operators shall be used when head space above door opening exceeds 1 foot
k. Extra bracing shall be required on top section for draw bar applications.
l. Electric operators shall be gear reducer driven with adjustable slip clutch on gearbox output shaft. Gear reductions shall be 40 – 1.
m. Electric Operators shall be 115 volt, single phase, 60 hertz, 1 horsepower induction motors.
n. Control Logic for Fire Station doors shall be Evans Overhead Door control panel # NT-4316 or approved alternate. Panel shall be mounted at 60 inches above finished floor.
o. Mechanical operators for jack shaft operated doors shall employ a disconnect chain that will disengage the electric operator and a hand pull chain for raising and lowering the door in the event of a power outage or system failure.
p. Mechanical override for trolley or bar type operators will employ a means of disconnect at the user level by utilizing a cable through eyebolts and placing the hand pull at user level.

F. DOOR HARDWARE

1. Hinge Types

a. Hinge types shall conform to the applicable requirement of Specification FF-H-121c except as specified otherwise herein.
b. Interior doors medium traffic: ST-CB179, HGBB1279, ST =Stanley, HG=Hager
c. Interior doors high traffic: ST-CB168, HG – BB1168, ST =Stanley, HG=Hager
d. Exterior doors medium traffic: ST-CB168, HG- BB1168, ST =Stanley, HG=Hager
e. Exterior doors high traffic: ST- 661HD, RO780-122HD, ST=Stanley, RO=Roton
f. Electrified Hinge: Stanley CECB168-10wire, JB-2 mortar guard or approved equal

2. Door Locks

a. Mortise Type locks and latches shall be heavy-duty with hinged, anti-friction ¾ inch throw latchbolt with anti-friction piece made of self-lubricating stainless steel. The functions and design shall be as indicated on the appropriate hardware groups. Deadbolt functions shall be 1-inch projection made of hardened stainless steel. Both deadbolt and latchbolt are to extend into the case a minimum of 3/8 inch when fully extended. Furnish locksets and latchsets with sufficient curved strike lip to protect door trim. Provide locksets with Best 7-pin interchangeable core cylinders. All mortise cylinders shall have a concealed internal setscrew for securing the cylinder to the lockset. The internal setscrew will be accessible only by removing the core from the cylinder body. All mortise locksets and latchsets

most conform to ANSI A156.13, Series 1000, Operational Grade 1 and be listed by UL. Lockset must fit ANSI A115.1 door preparation. Locksets and latchsets shall have self-aligning, thru-bolted trim. Auxiliary deadlatch shall be made of one-piece stainless steel permanently lubricated. Lever handles must be of forged or cast brass, bronze or stainless steel construction and conform to ANSI A117.1. Levers that contain a hollow cavity are not acceptable. Spindle shall be such that if forced it will twist first, then break, thus preventing forced entry. Levers shall be operated with a roller bearing spindle hub mechanism.

b. Exterior doors: Locks shall be Best 35H series 15H 626
c. Cylindrical lever type locksets must be extra heavy-duty type with 2-3/4 inch backset, or greater as specified, with a 9/16 inch throw latchbolt. Provide locksets with Best 7-pin interchangeable core. Locksets and latchsets must conform to ANSI A156.2, series 4000, Grade 1, and be UL listed. Locksets and cores shall be of the same manufacturer to maintain complete lockset warranty. Locksets and latchsets with levers must fit modified ANSI A115.2 door preparation. Locksets shall have anti rotational studs that are thru-bolted. Keyed lever shall not have exposed “keeper” hole. Each lever shall have independent spring mechanism designed to control the lever only. Outside lever sleeve shall be seamless,. Of one-piece construction made of a hardened steel alloy. Keyed lever shall be removable only after core is removed, by authorized control key, to allow access to knob “keeper. Hub, side plate, anti-rotational studs shall be a one-piece casting with a shrouded locking lug. Locksets outside locked lever must withstand 1400 inch pounds of torque. In excess of that, a replaceable part will shear, not allowing entry by lever. Permanent core face must be the same finish as the lockset finish, which is Best 9K 15D 626 Finish.
d. Interior Doors: Locks shall have minimum 9/16” throw. All deadbolts shall have 1 inch minimum throw. Comply with requirements of local security ordinances. Lock Series and Design: Best 93K7 15D. Cylinders shall be Best 7-Pin Keyway
e. Electrical locks shall be Best 35HW7EWEU-IDH-LMS or approved equal. Power supply for electric locks shall be Basis BAS5PMCTX 12/24 VOLT DC 5 AMP.
f. Auxiliary locks shall be Best or approved equal model 5L series for cabinets and drawers, 21B Series 722-I for padlocks.

3. COORDINATOR

When a coordinator is required by the Fire Department specify Ives COR52 x MB bracket (as required) or approved equal.

4. SECURITY ACCESS CONTROL

Security access control shall be Hirsh with no substitutes allowed. Components shall be #DS47L-HI Scramble Pad, MB-9 Exterior Mounting Box, M2N or M8N controller, DM9600A-DL Dial-up Connection, MELM2 Line Supervision, AL600ULX x 12Y7A Power Supply/Back-up Batteries, Wire shall be twisted, shielded plenum-rated Cable. The installation of the Security Access Controls shall be by Best Access Systems

5. EXIT DEVICES

a. Furnish all sets of wood doors with through bolts unless otherwise specified. Lever handle trim shall match locksets. All touch type devices shall have deadlocking latchbolt, stainless steel touchpads or vinyl covered pads and be non-handed. The unlatching force shall not exceed 15 pounds when applied in the direction of exit travel. All sets shall be 98/99 Series of Von Duprin or approved equal. On Fire Label Doors use the 98F/99F Series of Von Duprin or approved equal.
b. Double doors will be provided with Keyed removable mullion and 98/99 Series Von Duprin rim fire devices.

6. DOOR CLOSERS

a. Door closers shall meet Americans with Disabilities Act Guidelines. Door closers shall comply with ANSI A1117.1 for door opening force and delayed action closing.
b. All door frames shall be reinforced at closer mounting locations.
c. Surface mounted LCN 4041 Series or approved equal, 689 finish, spray to match other hardware, with 3 separate control valves (including back check) ANSI Grade I. Closers shall be equipped with size adjustment (1 thru 6). All closers shall be mounted on the inside of the room wherever possible. Where parallel arm closers are used extra duty arms (EDA) shall be used. Cushion stop arm (CUSH) arms shall be used on outswinging doors and hold open arms shall be used where required.
d. ADA Operators shall be Stanley Dura-Glide Series 2000, Horton Series 7000 or approved equal.

7. KICKPLATES

Shall be .050 minimum stainless steel 10 inches high, 36 inches high for high traffic doors, by 2 inches less than door width for single doors and one inch less than the door width for double doors. Finish 630.

8. STOPS AND BUMPERS

Wall-type stops and bumpers shall be Trimco 1270 series with proper anchor selected for substrate. Floor stops shall be Trimco 1210/1212 or approved equal, and shall be used on interior doors where required. Floor stops Trimco 1209 or approved equal, or similar as required to meet floor conditions shall be used on exterior doors. On non-rated wood doors with door closers, use the Trimco 1220-5, or approved equal, kick-down door holder.

9. SILENCERS

Supply three silencers each at jambs of single doors and two each at pairs of doors. Silencers are not required on doors having smoke seals.

10. WEATHERSTRIP AND SEALS

a. Door bottoms shall be Type 57AV or as listed in hardware sets.
b. Weatherstrip shall be Type 29310CP or as listed in hardware sets.
c. Astragal shall be 357SP or as listed in hardware sets.

11. THRESHOLDS

Shall be type 271A/272A or as detailed on plans or listed in hardware sets.

12. HARDWARE FINISHES

a. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lock for color and texture.
b. Provide finishes which match those established by Builders Hardware Manufacturers Association (BHMA).
c. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case of lesser quality than specified for the applicable units of hardware by referenced standards.

d. Provide protective lacquer coating on exposed hardware finishes or brass, bronze, and aluminum, except as otherwise indicated. The suffix "-NL" shall be used with standard finish designations to indicate "no lacquer".

e. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in "Materials and Finishes Standard 1301" by BHMA, including coordination with the traditional U.S finishes shown by certain manufacturers for their products.

13. LOCK CYLINDERS AND KEYING

a. Provide construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished on the same keyway (or key section) as the Owner's permanent keying system. Permanent cores and keys shall be prepared according to the direction of the Facilities Management Division.

b. All cylinders shall be Best 7-pin, interchangeable core. (Peaks on certain existing buildings). Final decision as to which system, either Peaks or Standard, will be determined by the Facilities Management Division.

c. Grand Master keys, Master keys and other Security keys shall be transmitted to the owner by registered mail, return receipt requested to the following address. Glenn Zellmer, Facilities Management Cy208, City of Scottsdale, 9191 E San Salvador Dr., Scottsdale, AZ 85258

d. Furnish keys in the following quantities: 4 each Master keys, 2 each Control keys for permanent system. 2 each Change keys for each keyed core, 9 each Construction master keys, and 1 each Control key for construction cores. Keys shall be tagged, identified and delivered to the contracting officer by registered mail or delivered in person after receiving a signed receipt from the contracting officer.

G. AUTOMATIC TRAFFIC CONTROL ROLLING GATES

1. Power operator shall utilize electric motor and hydraulic drive.
2. The gate shall utilize V-groove steel wheels that follow an inverted angle iron track set in a concrete footing.
3. Keypad to control access must be compatible with the city's Hirsch system.

9-3.300 BUILDING COMPONENTS

A. BATH PARTITIONS

1. Bath partitions shall be solid plastic in office buildings, Santana or equal
2. Bath partitions in park restrooms and in vandal resistant construction shall be 8" x 6" x 16" masonry units or equal construction with hollow metal partial doors and frames, with 1-inch deadbolt locks.
3. Handicapped accessible per current code.

B. RESTROOM ACCESSORIES

1. JRT Junior Toilet Paper Dispensers for Park restrooms shall be 14 gauge stainless steel with padlock hasp as manufactured by Vandal Stop Products or approved equal.
2. Soap dispensers shall be Nice Touch plastic soap dispensers #380143; white; for office/nicer public facilities.

3. Sanitary napkin machines shall be “Bobrick” model #B-2800, surface mount or #B-3500 recessed mount, with 25 cent coin mechanisms.
4. Toilet seat covers without lock; surface mount; Bobrick #B-221. In park restrooms and other vandal resistant construction seat cover dispensers shall be 14-gauge stainless steel with padlock hasp as manufactured by Vandal Stop products or approved equal.

C. CEILING TILE

Lay in tile shall be Armstrong # 2712 Dune Second look II 24x48x 9/16” scored panels with angled tegular edge, scratch resistant. Concession stands, locker rooms, kitchens, evaporative cooled areas and other places of high moisture or cleanliness shall be Armstrong # 1721 Clean Room Mylar washable, soil resistant 24 x 48”x15/16” ceiling tile.

D. ROOFING

1. Modified bitumen roofing system required.
2. Approved manufacturers are: Performance Roofing, Firestone, Johns-Mansville
3. Applicable components (based on Performance Roofing [Derbigum] product for reference):
   a. Roofing Membrane shall be Performance Roof Systems specification 1R1G-FR Derbicolor system applied over the existing roofing. Adhere to the current Performance Roof Systems Specifications for application of the Derbicolor membrane and flashing assemblies.
   b. Base Sheet shall be PRS Glass Base, an oxidized asphalt fiberglass base sheet that meets or exceeds ASTM D-4601 Type II specifications.
   c. Membrane shall be Derbigum GP FR, a 180-mil fire resistant atactic plypropylene (APP) membrane reinforced with a fiberglass mat and a polyester scrim and surfaced with a factory applied mineral slate surface.
   d. Cold Adhesive shall be "Permastic" asphalt based adhesive containing Rubberlux formulated for adhering polymer modified asphalt roofing membranes and membrane components. Permastic as listed by Underwriters Laboratories, Inc., must be applied by squeegee.
   e. Cants shall be mineral fiber conforming to ASTM C726 or perlite conforming to ASTM C728. Sizes may vary.
   f. Flashing Adhesive shall be "Perflash" asphalt based adhesive containing Rubberlux formulated for adhering polymer modified asphalt flashing membranes to vertical surfaces.
   g. Primer for Sheet Metal shall be Regular asphalt primer per ASTM D41.

HVAC SYSTEMS

9-3.400

The provisions of these standards regulate the design of the mechanical systems. Emphasis shall be placed on system efficiency, energy, and water conservation, economy of maintenance, and utility expense to minimize life-cycle costs.

It shall be the responsibility of the consulting engineer to secure all as-built drawings and to make field inspections, as required, and to obtain all information needed for the work.

1. Provide complete mechanical systems including:
   a. HVAC system.
   b. Fans, sheet metal work, registers, grilles and diffusers.
   c. Piping distribution system and insulation.
   d. Humidification systems.
   e. Temperature controls.
   f. Commissioning/Testing, adjusting and balancing.

2. Modify, relocate and extend existing service to accommodate new work. Relocate existing components as required for new system.
3. Coordinate with Owner's room uses to provide adequate system for all contract area.
4. Coordinate location of mechanical systems to avoid interference with location of other systems, including piping and lighting fixtures.
5. Do not cut structural elements without prior written approval.

A. General Requirements

1. All installations shall conform to all national and local codes as adopted by the city.
2. Provide "As Built" drawings on CD-Rom discs, Auto Cad format, and hard copy.
3. All units shall have disconnects mounted within 6 feet of units.
4. Disconnects to be Heavy Duty Blade type.
5. All control wiring shall be routed and installed into EMT conduit.
6. All seal-tight conduit shall be metal core, with metal connectors
7. Flex duct limited to 6 feet, Foil backed
8. Insulate condensate lines; condensate lines shall be copper. Condensate lines shall have a union installed within 6 inches condensate outlet of the unit.
9. No standing pilots
10. Use standard size and type filters as defined by Eco Air C-35 or other local A/C filter manufacturer.
11. 2 inch minimum thickness, pleated, filters only, with return air filter frame to ceiling mounted. Use filter grill type or equivalent and specified in submittal form.
12. Sight glasses on liquid lines of split direct exchange (DX) systems.
13. Refrigerant piping shall be brazed using filler material meeting AWS A5.8.
14. All control wiring will be run in electrical metallic tubing (EMT).
15. Split DX systems will have total refrigerant charge weighed and the number will be furnished to the HVAC crew.
16. Filter boxes shall not contain obstructions in filter tracks, screwhead, thread, and rivet.
17. Only personnel with a universal certification for refrigerant recovery and handling are shall be permitted to work on the refrigeration equipment for the city.
18. Have the abandoned in place materials removed before a job is started. All unused equipment related to the upgrade shall be removed.
19. After the service/install is completed contract shall "thoroughly clean area of debris that they caused."
20. 10% of funds shall be withheld by city until job is completed to satisfaction of city Inspector and Facilities Management Division.

B. Submittals

1. Submit for approval product data, operating and maintenance data, balancing reports and record documents.
2. Submit signed and sealed shop drawings for review and as required per contract.
3. Prior to the completion of a project, a minimum of two sets of maintenance manuals, operating manuals, parts manuals, as-built and shop drawings of all equipment covered in this section shall be submitted to the city, with one set specifically to the HVAC team.

C. Quality Assurance

1. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use journeyman level installers with universal certification for proper refrigerant usage. Deliver, handle, and store materials in accordance with manufacturers instructions.
2. Arrangement of systems indicated on the drawings is diagrammatic, and indicates the minimum requirements for mechanical work. Site conditions shall determine the actual arrangement of systems. Take field measurements before fabrication. Be responsible for accuracy of dimensions and layout. Overhead ductwork shall be laid out to obtain maximum headroom.
3. All installations shall be designed for total system energy efficiency and conservation. HVAC systems should be designed based on a life cycle cost analysis. A comprehensive energy study shall be performed for all buildings 10,000 sq ft. or more, using computer simulation programs such a TRACE, DOE2, or others approved for use by the federal government. The computer simulation program shall be used to perform the energy analysis and evaluation of alternative building methods, materials, orientations, lighting and HVAC systems. A diversity factor will not be calculated into the sizing of HVAC equipment to eliminate the down sizing of the equipment.
4. All systems shall be designed so that they are easily adaptable to the future growth of the facility.
5. All design considerations shall comply with American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) standards.
6. Exterior design conditions:
   a. Summer-120 degree F Dry Bulb, 76 degree F Wet Bulb
   b. Winter-34 degree F Dry Bulb
7. Interior design condition:
   a. Cooling-72 degrees F Dry Bulb
   b. Heating-74 degrees F Dry Bulb
   c. Evaporative cooling – 1 air change/2 minutes
8. No equipment, piping, hangers, ducting, or electrical will be abandoned in place. All unused equipment will be removed.

D. Products/Materials

1. Piping: Schedule 40 seamless black steel, American Society of Testing and Materials (ASTM) A 53, Grade A;
2. Type L copper pipe ASTM B68. PVC shall not be permitted for use.
3. Where a single backflow preventor feeds 2 or more areas such as a cooling tower and a chilled water loop, dual checks with unions shall be installed on each to prevent water from one area flowing to another area. Prefer Watts #7, suffix U or equal.

E. Component Standards

1. In large systems (10 tons or more), utilize several small units.
2. In larger systems (100 tons or more), when a single unit is called for, utilize high efficiency, multiple-compressor, water-cooled chiller.
3. Telephone and Emergency Equipment Requiring cooling 24 hours a day, shall have separate independent back-up cooling units, under energy management control.
4. All equipment shall be rated at Air Conditioning and Refrigeration Institute's (ARI) conditions.

5. Unitary air conditioners and heat pumps shall be selected based on seasonal energy efficiency ratio (SEER) (units less than 5.4 tons) and energy efficiency ratio (EER) (units over 5.4 tons) ratings. SEER rating should be a minimum of 13.0 and EER rating should be a minimum of 12.
6. Chillers shall utilize HFC refrigerants. Chillers shall not exceed consumption of 0.56 kw/ton (100% full load in accordance with ARI standards).
7. All electric motors exceeding 1,000 operating hours annually shall be energy efficient and shall have minimum acceptable nominal efficiency for single speed motors as specified below. Energy efficiency rating must be made using testing methodology IEEE-112, Test Method B.

HP	Min. Rated EFF (%)
1 – 4	84.0%
5 – 9	89.5%
10 – 19	91.5%
20 – 49	92.8%
50 – 99	94.1%
100 – 124	94.5%
125 & Greater	95.0%

1. Placement of Equipment

a. To minimize safety hazards and to provide for ease of accessibility for maintenance and repair, major air conditioning and heating equipment components (compressors, air handlers, heaters, etc.), shall not be located in areas immediately above hard ceilings. If design suggests that major equipment be located in hard ceiling areas, approval of the HVAC team is required. In all cases, an adequate permanent work platform shall be provided for maintenance functions.
b. Roof-mounted equipment shall be curbed. Roof-mounted equipment shall not be located closer than six feet from roof edge. Safe access must be provided for all roof-mounted equipment.
c. Equipment shall not be placed in a space in such a manner that the maintenance, repair, removal of the equipment requires any alteration to the doorway, roof, ceiling, floor, wall or adjacent equipment.
d. Multi-storied facilities shall be designated with a minimum of one air handler per floor.
e. Central air distribution shall be accomplished by variable air volume systems with variable fan speed rather than constant volume systems for the same system static pressure. (This approach reduces energy use during part load conditions and takes advantage of each zone's operational characteristics).
f. Consider economizer cycle (free cooling) by using "plate & frame" heat exchanger for systems with cooling tower capacity exceeding 100 tons and energy management and temperature control system (EMTCS) for automated valve control.
g. Avoid multi-zoned packaged air conditioning units.
h. Evaporative cooling shall be evaluated and installed where practical. Evaporative coolers shall utilize Celdek/Glasdek pad media, or approved equal, which has a minimum thickness of 8 inches.

2. Air Distribution System

a. Air shall be supplied to the occupied space by low-velocity ducts.

b. To minimize air circulation fan horsepower, ductwork shall be designed for the lowest practical total pressure drop.

3. Small Buildings (Up to 25 tons)

a. Utilize packaged and split heat pump and a/c systems with a SEER rating of 13.0 or higher with economizers.
b. Utilize gas-fired furnace.
c. All units shall be ground mounted when possible.
d. Sight glasses shall be installed on all split systems.
e. All units should have clear access and be installed so they may be maintained without the use of ladders.

4. Medium Buildings (25-100 tons)

a. Utilize air cooled high efficiency package chiller units.
b. Utilize reciprocating or Scroll compressors.
c. Utilize gas-fired boiler (heating) (Acceptable manufacturers are Parker, Cleaver-Brooks or Unilux.)
d. Fan powered variable air volume (VAV) boxes.
e. Four pipe system or Central air handling station with variable frequency drive (VFD) and hot water coil in fan powered VAV box.
f. All outdoor units shall be ground mounted when possible.
g. Sight glasses shall be installed on all split systems.
h. All units should have clear access and be installed so they may be maintained without the use of ladders.
i. Indoor heating and cooling closed loop systems shall use a bladder type expansion tank

5. Large Building (100 tons and Greater)

a. High efficiency chiller.
b. Screw or Centrifugal compressor shall have open drive motors using VFD
c. Gas fired boiler (heating).
d. Fan powered VAV boxes.
e. Four pipe system or Central air handling station with VFD and hot water coil in fan powered VAV box.
f. System shall be capable of using 100% outside air or plate and frame heat exchanger for economizer operation.
g. All units shall have clear access and be installed on the ground floor.
h. Efficiency - .65KW per ton-ARI Certified in the form of an Integrated Part Load Value (IPLV).
i. Indoor heating and cooling closed loop systems shall use a bladder type expansion tank

6. Pumps

a. Pumps shall be of the back pullout design, end suction, close coupled base mounted.
b. High EEF motors.
c. Isolation valves shall be included in discharge and suction line.

7. Cooling Towers

a. Non-sprinkled dual cell.
b. Plastic fill and metering devices.
c. Vertical discharge, propeller fan only.
d. Motor out of the air stream.
e. Tower shall incorporate a bypass system low ambient conditions.

f. VFD for periods of low load conditions.

8. Water Treatment

a. Indoor loop pot feed, engineered to size
b. Cooling tower outdoor open loop - solid state (Lakewood model 2175-RTC) controller.
c. Chemical pump and 55 gallon plastic drum with containment system.

9. Energy Management Control System

a. All buildings utilizing 50 tons or greater cooling systems shall be wired to and controlled by the city's existing energy management system (EMS).
b. All buildings shall be direct digital control (DDC) micro processor capable of running in the city's existing system
c. All front-end controllers shall connect to the city's intranet with an Ethernet connection
d. All front-end controllers shall be a Tritium based platform powered by a Niagara Framework
e. Controllers shall have the capability in communicating in BACnet, LonWorks and MODBUS protocols.

10. Evaporative Coolers

a. CELdek or GLASdek media shall be used in all coolers
b. Evaporative cooling units manufactured by United Metal Products or equal are shall be installed.
c. On low static applications with short duct drops into large open spaces axial fan style coolers shall be used. United Metal Products Fan-Air or equal.
d. On higher static applications standard "squirrel cage" blower wheel coolers shall be used. United Metal Products Cel-Air or equal
e. To prevent scale buildup a timed-based basin flushing system shall be installed in all coolers.
f. Evaporative coolers drains shall be piped with minimum Type M copper to floor sink or custodial sink.
g. Evaporative supply water lines shall be minimum Type L copper on roof mounted units
h. Evaporative supply water lines shall have a ball valve shut off at each units

11. Commercial Ice Machine

a. Manitowoc ice machines are the only acceptable product.
b. Chillers to have hydrogen fluorine carbon HFC 134a refrigerant.
c. Remote mounted condensers on indoor applications.
d. No water-cooled condensers.

12. Exhaust Fans

a. All exhaust fans over 1/3 hp shall be belt driven.
b. All belt driven blowers shall have grease zerk fittings.

9-3.500 ELECTRICAL SYSTEMS

A. General Electrical Requirements

1. Outlet and switch devices shall be commercial grade and back wired / no solderless connections allowed at devices.
2. All convenience outlets shall be commercial grade back wired and 20 amp rated

3. All exterior and interior outlets when ground fault circuit interrupter (GFCI) protection is required shall be 20 amp rated.
4. When used for controlling interior and exterior lighting, devices shall be 120 / 277 volt 20 amp rated for inductive loads. These devices shall include snap switches, motion sensors, photo cells and clock contacts.
5. Circuit breakers at panels shall not be used as the sole device for switching of lighting loads except designated emergency and night lighting circuits.
6. When contactors are used for switching of parking lot lighting, exterior building lighting, site lighting, and security lighting, they shall be photo cell controlled when dusk to dawn needs are required and digital clock with battery back up controlled when dual level lighting is required.
7. All interior and exterior lighting shall be high intensity discharge HID type utilizing T-8, PL, compact fluorescent, metal halide, high pressure sodium or induction lamps.
8. When illumination of grounds and walkways is required, building exterior lighting in conjunction with pole lights shall be used.
9. Bollards, in ground up lights, quartz and low voltage lighting not allowed.
10. All pole lighting shall be mounted on concrete bases a minimum of 30" above grade.
11. Inline fuses shall be installed at hand holes in all poles for each fixture.
12. Concrete in ground J- boxes shall be installed at base of each pole for termination of conductors serving each pole. Do not pull all circuits through pole. All terminations shall be waterproof with sufficient clearance from cover and conduit stubs so as not to damage conductors. Duct seal conduits..
13. All conduits and boxes shall be concealed as much as possible, armored cable not allowed.
14. All exterior exposed conduits extending above grade and up to 8 feet shall be (a) galvanized rigid or (b) intermediate metal conduit secured with unistrut or one-hole straps with back.
15. Exterior surface mounted boxes shall be steel or malleable iron and secured with machine screws / no ALUM or ALUM alloy boxes to be used.
16. All interior wiring shall be 600 volt THWN stranded.
17. All exterior wiring shall be 600 volt XHHW stranded.
18. Panels shall have hinged fronts and bolt in breakers.
19. Panels shall be surface mounted, if not provide at least four ¾" conduits for future use.
20. Transformers for power and lighting shall be K-rated.
21. Emergency power for emergency and exit lighting shall be separately derived, either by generator or as battery-powered fixtures. No inverters shall be installed in fixtures.
22. Exit lights shall be LED type.
23. When polyphase circuits share a neutral and serve computer and electronic equipment that neutral shall be oversized one time e.g.#12 conductors with #10 AWG neutral.
24. Stainless steel covers shall be on all interior devices/switches, receptacles, dimmers, and fan speed controls.
25. All 120/208 panels serving computer or electronic loads shall be equipped with an isolated ground.
26. All junction boxes shall be identified with panel ID, circuit ID, and circuit voltage.
27. All switch and outlet plates shall be labeled with CKT and PNL ID.

28. In all trenches with electrical conduits, install a red 3-inch warning tape with the inscription CAUTION BURIED ELECTRIC LINES BELOW 6 inches to 10 inches above conduits.
29. Maintain a clear 25-foot radius from pole base to any large landscape items trees, shrubs, etc.
30. All contactors motor starters shall be NEMA, not IEC.
31. All fluorescent lamps shall be cool white @ 3500 k.
32. All exterior lighting fixtures and lenses shall be vandal resistant.
33. Electrical panels shall be located in rooms designed exclusively for electrical equipment. Any storage is prohibited.
34. Maintain a clear 25-foot radius from pole base to any large landscape items, such as trees, shrubs, etc.
35. All contactors motor starters shall be NEMA not IEC.
36. All fluorescent lamps shall be cool white @ 3500 k.
37. All exterior lighting fixtures and lenses shall be vandal resistant.
38. Electrical panels shall be located in rooms designed exclusively for electrical equipment. Any storage is prohibited.
39. Electrical distribution and utilization will be designed to have the lowest possible fault current potential.
40. SES 400 amp and above shall be fused.
41. All fuses shall be of low peak type.
42. All anchors shall be reversible. There should be no plastic anchors on the exterior of the building.

public works & facilities

CONSTRUCTION BID DOCUMENTS

9-4

This section provides specific requirements for construction bid documents for city public works projects. It gives direction for preparing construction drawings, discovering a project's special provisions, creating a bid schedule and estimating construction costs.

Capital Projects
7447 E Indian School Road
Suite 205
480-312- 7250

Municipal Services
9191 E San Salvador Dr
480-312- 5550

One Stop Shop
7447 E Indian School Road
Suite 100
480-312-2500

Current Planning
7447 E Indian School Road
Suite 105
480-312-7000

Plan Review
7447 E Indian School Road
Suite 105
480-312-7080

Fire Department Plan Review
7447 E Indian School Road
Suite 125
480-312-7080

contents

Sections

Appendix

CONSTRUCTION BID DOCUMENTS

GENERAL INFORMATION 9-4.000

The project's scope of work will contain specific requirements for the construction documents provided by the consultant. Generally, the consultant provides the following bidding documents to the city of Scottsdale. The Project Manager determines how many copies of each document are needed.

- Construction Plans
- Project Special Provisions
- Project Schedule of Bid Items
- Construction Cost Estimate.

CONSTRUCTION DRAWINGS 9-4.100

Original drawings submitted to the city will remain property of the city. All drawings will be on clear 4 mil Mylar with original ink, mechanically plotted or photographically reproduced. Ammonia based sepias or electrostatic media will not be accepted by the city. All mechanically plotted drawings will be of such quality that the plotted medium does not peel or scratch off with reasonable handling. The consultant will guarantee the quality of the drawings and replace any drawings on which the lettering and/or line work peels, smudges, or is otherwise deemed to be unacceptable by the city. Such drawing replacement will be at no cost to the city.

The design engineer will provide the city with electronic files of the final construction drawings, special provisions, calculations, reports, schedule of bid items, and other documents as specified. Drawing formats will be in MicroStation, the latest version. The special provisions and schedule of bid items will be in Microsoft Word and/or Excel, the latest versions. Electronic files will be submitted on CD.

SPECIAL PROVISIONS / TECHNICAL SPECIFICATIONS 9-4.200

"Invitation To Bid" documents follow a specific format for all Capital Improvement Projects. They include city drafted boiler plates consisting of the notice inviting bids, information for bidders, general conditions, bid forms, contracts, bonding and insurance forms, etc. The project's special provisions will supplement the city's general conditions.

Upon request, the city will provide the consultant with a sample format of the project's special provisions, including a compilation of guideline special provisions. The consultant must thoroughly review the special provisions guideline, determine which portions are applicable for his/her specific project, and determine the need for supplementation.

The special provisions are updated as needed; therefore, the consultant should request a current version for each capital project design.

9-4.300 BID SCHEDULE

The consultant will complete a standard schedule of bid items consistent with the city's required format, available online at www.scottsdaleaz.gov/vendors/biditemschedule.asp.

Bid item numbers will be taken from a master list of items that is available from Capital Project Management (CPM) Plan Review. Project specific item numbers that are not listed will be coordinated with CPM Plan Review.

The master bid item list is frequently updated so the consultant should request a current version for each design project.

9-4.400 CONSTRUCTION COST ESTIMATE

The engineer / architect will provide the city with a final detailed estimate of the probable cost of construction.